

M.A. (Education)

SECOND YEAR

MAEDN-501

INSTITUTE OF DISTANCE EDUCATION
Rajiv Gandhi University

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EDUCATIONAL TECHNOLOGY

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MA [Education]

Second Year

MAEDN - 501

RAJIV GANDHI UNIVERSITY
Arunachal Pradesh, INDIA - 791 112

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About the University

Rajiv Gandhi University (formerly Arunachal University) is a premier institution for higher education in the state of Arunachal Pradesh and has completed twenty-five years of its existence. Late Smt. Indira Gandhi, the then Prime Minister of India, laid the foundation stone of the university on 4th February, 1984 at Rono Hills, where the present campus is located.

Ever since its inception, the university has been trying to achieve excellence and fulfill the objectives as envisaged in the University Act. The university received academic recognition under Section 2(f) from the University Grants Commission on 28th March, 1985 and started functioning from 1st April, 1985. It got financial recognition under section 12-B of the UGC on 25th March, 1994. Since then Rajiv Gandhi University, (then Arunachal University) has carved a niche for itself in the educational scenario of the country following its selection as a University with potential for excellence by a high-level expert committee of the University Grants Commission from among universities in India.

The University was converted into a Central University with effect from 9th April, 2007 as per notification of the Ministry of Human Resource Development, Government of India.

The University is located atop Rono Hills on a picturesque tableland of 302 acres overlooking the river Dikrong. It is 6.5 km from the National Highway 52-A and 25 km from Itanagar, the State capital. The campus is linked with the National Highway by the Dikrong bridge.

The teaching and research programmes of the University are designed with a view to play a positive role in the socio-economic and cultural development of the State. The University offers Undergraduate,- Post-graduate, M.Phil and Ph.D. programmes. The Department of Education also offers the B.Ed. programme.

There are fifteen colleges affiliated to the University. The University has been extending educational facilities to students from the neighbouring states, particularly Assam. The strength of students in different departments of the University and in affiliated colleges has been steadily increasing.

The faculty members have been actively engaged in research activities with financial support from UGC and other funding agencies. Since inception, a number of proposals on research projects have been sanctioned by various funding agencies to the University. Various departments have organized numerous seminars, workshops and conferences. Many faculty members have participated in national and international conferences and seminars held within the country and abroad. Eminent scholars and distinguished personalities have visited the University and delivered lectures on various disciplines.

The academic year 2000-2001 was a year of consolidation for the University. The switch over from the annual to the semester system took off smoothly and the performance of the students registered a marked improvement. Various syllabi designed by Boards of Post-graduate Studies (BPGS) have been implemented. VSAT facility installed by the ERNET India, New Delhi under the UGC-Infonet program, provides Internet access.

In spite of infrastructural constraints, the University has been maintaining its academic excellence. The University has strictly adhered to the academic calendar, conducted the examinations and declared the results on time. The students from the University have found placements not only in State and Central Government Services, but also in various institutions, industries and organizations. Many students have emerged successful in the National Eligibility Test (NET).

Since inception, the University has made significant progress in teaching, research, innovations in curriculum development and developing infrastructure.

About IDE

The formal system of higher education in our country is facing the problems of access, limitation of seats, lack of facilities and infrastructure. Academicians from various disciplines opine that it is learning which is more important and not the channel of education. The education through distance mode is an alternative mode of imparting instruction to overcome the problems of access, infrastructure and socio-economic barriers. This will meet the demand for qualitative higher education of millions of people who cannot get admission in the regular system and wish to pursue their education. It also helps interested employed and unemployed men and women to continue with their higher education. Distance education is a distinct approach to impart education to learners who remained away in the space and/or time from the teachers and teaching institutions on account of economic, social and other considerations. Our main aim is to provide higher education opportunities to those who are unable to join regular academic and vocational education programmes in the affiliated colleges of the University and make higher education reach to the doorsteps in rural and geographically remote areas of Arunachal Pradesh in particular and North-eastern part of India in general. In 2008, the Centre for Distance Education has been renamed as "Institute of Distance Education (IDE)."

Continuing the endeavor to expand the learning opportunities for distant learners, IDE has introduced Post Graduate Courses in 5 subjects (Education, English, Hindi, History and Political Science) from the Academic Session 2013-14.

The Institute of Distance Education is housed in the Physical Sciences Faculty Building (first floor) next to the University Library. The University campus is 6 kms from NERIST point on National Highway 52A. The University buses ply to NERIST point regularly.

Outstanding Features of Institute of Distance Education:

(i) At Par with Regular Mode

Eligibility requirements, curricular content, mode of examination and the award of degrees are on par with the colleges affiliated to the Rajiv Gandhi University and the Department(s) of the University.

(ii) Self-Instructional Study Material (SISM)

The students are provided SISM prepared by the Institute and approved by Distance Education Council (DEC), New Delhi. This will be provided at the time of admission at the IDE or its Study Centres. SISM is provided only in English except Hindi subject.

(iii) Contact and Counselling Programme (CCP)

The course curriculum of every programme involves counselling in the form of personal contact programme of duration of approximately 7-15 days. The CCP shall not be compulsory for BA. However for professional courses and MA the attendance in CCP will be mandatory.

(iv) Field Training and Project

For professional course(s) there shall be provision of field training and project writing in the concerned subject.

(v) Medium of Instruction and Examination

The medium of instruction and examination will be English for all the subjects except for those subjects where the learners will need to write in the respective languages.

(vi) Subject/Counselling Coordinators

For developing study material, the IDE appoints subject coordinators from within and outside the University. In order to run the PCCP effectively Counselling Coordinators are engaged from the Departments of the University, The Counselling-Coordinators do necessary coordination for involving resource persons in contact and counselling programme and assignment evaluation. The learners can also contact them for clarifying their difficulties in then respective subjects.

SYLLABI-BOOK MAPPING TABLE

Educational Technology

	Syllabi	Mapping in Book
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UNIT II	**Teaching-learning Process** – Educational Objectives with special reference to Cognitive, Affective and Psycomotor Domain. – Nature of teaching-learning process – Teaching variables-Phrases of Teaching-Pre-active, Inter-active, Post-active – Levels and operations of teaching learning	**Unit 2:** Teaching-Learning Process **(Pages 59-112)**
UNIT III	**Models of teaching:** – Nature and elements of teaching models. – Information processing models.	**Unit 3:** Models of Teaching **(Pages 113-131)**
UNIT IV	**Process of Communication and Instruction:** – Communication process; concept of communication, principles Modes and Barriers of communication, classroom communication (interaction, verbal-non- verbal) – Modalities of Teaching-difference between Teaching and Instruction, conditioning & Training	**Unit 4:** Process of Communication and Instruction **(Pages 133-160)**
UNIT V	**Instructional Technology:** – Programme learning: Concepts, Principles and Steps – Types of PI: linear, branching and mathetics – Development of PLM	**Unit 5:** Instructional Technology **(Pages 161-200)**
UNIT VI	**Classification of Educational Technology Equipment:** – Edger Dale's Cone of Experience – Mass, multi-media approach	**Unit 6:** Classification of Educational Technology Equipment **(Pages 201-241)**

UNIT VI	**Behavioral Technology:** – Modification of teaching behaviour: micro Teaching, S.S.S.T. – Flander's Interaction Analysis (FIACS)	**Unit 7:** Behavioural Technology **(Pages 243-264)**
UNIT VII	**Modern Approaches of Teaching:** – Computer-assisted Instruction (CAI), Personalized system of instruction (PSI), SAI, 1GSI and Modular Approach	**Unit 8:** Modern Approaches of Teaching **(Pages 265-299)**

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INTRODUCTION

Educational Technology (ET) is the efficient organisation of any learning system adopting or adapting itself to methods, processes, and products to serve identified educational goals. This involves systematic identification of the goals of education, recognition of the diversity of learners' needs, the contexts in which learning will take place, and the range of provisions needed for each of these. The challenge is to design appropriate systems that will provide for and enable appropriate teaching-learning systems that could realise the identified goals. The key to meeting this challenge is an appreciation of the role of ET as an agent of change in the classroom, which includes not only the teacher and the teaching-learning process but also systemic issues like reach, equity, and quality.

Over the past decades, educational technology in India has taken two routes: The first involved a large number of experiments aimed at the qualitative improvement of schools, adopted the systems approach to analyze the problems plaguing the particular situation, and have evolved a range of solutions. These have included the development of flexible systems, alternative curricula, multilevel organisation of classes; low-cost teaching-learning materials, innovative activities, continuous support systems for teacher training, etc. While many of these experiments have demonstrated intrinsic merit, they have been restricted to pockets of intense practice and have failed to influence the larger school system. The second is government sponsored schemes such as the Educational Technology Scheme and the Computer Literacy and Studies in Schools (CLASS) and their present-day analogues, including partnerships with global players. This included the supply of radio-cum-cassette players, colour televisions, microcomputers, present-day computer labs, and even satellite-receiving terminals. These schemes have largely remained supply-driven, equipment-centred, and disseminative in design. Scant attention has been paid to the development of the entire support system that would establish ET as a reliable, relevant, and timely intervention, and despite clear indications of the necessity for this action.

This book — *Educational Technology* — has been designed keeping in mind the self-instruction mode (SIM) format and follows a simple pattern, wherein each unit of the book begins with an **Introduction** followed by the **Unit Objectives** for the topic. The content is then presented in a simple and easy-to-understand manner, and is interspersed with **Check Your Progress** questions to reinforce the student's understanding of the topic. A list of **Questions and Exercises** is also provided at the end of each unit. The **Summary**, **Key Terms** and **Activity** further act as useful tools for students and are meant for effective recapitulation of the text.

This book is divided into eight units:

Unit 1: Covers the meaning of educational technology, its scope and significance, the various approaches in teaching-learning process, and the objectives in of ET at the micro and macro levels.

Unit 2: Examines the teaching-learning process with special reference to cognitive, affective and psychomotor approaches. It also explores the nature and phases of the teaching-learning process.

Unit 3: Analyzes the models of teaching and how they have been improvised.

Unit 4: Traces the concept of communication and instructions, their differences and the barriers in communication.

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Unit 5: Introduces you to instructional technology that is being implemented in the educational process.

Unit 6: Discusses the classification of educational technology equipment. It also looks at Edger Dale's cone of experience, and mass media and multi-media approach.

Unit 7: Explores behavioural technology with emphasis on Flander's interaction analysis.

Unit 8: Discusses the modern approaches of teaching, such as computer-assisted instructions and personalised system of instruction.

UNIT 1 EDUCATION AND TECHNOLOGY

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1.0 INTRODUCTION

History has revealed that technology strengthens the hands of a teacher and makes his/her teaching more effective. Education has been benefited by technology in various ways and at various levels. From both, sociological and the economic points of view, technology has made an impact on education training. Education could keep pace and avoid costs and uncertainties of invention by merely following technological leads. Today, a number of institutions in developed and developing countries are offering courses through various communication technologies such as interactive TV, computer conferencing, the Internet and other modern media. Some distance education/open learning institutions in developing countries now are also offering courses electronically. As a result, a large number of learners are pursuing their studies through technology. In such conditions it becomes essential for all those in the field of education to be familiar with the nuances of the use of technology in education. Besides, it is well known that some teachers teach better by utilizing new methods and techniques, whereas others prefer old methods. Over the years, many techniques, methods and equipment have been developed by teachers and researchers to make the process of learning effective. This process of developing and using scientific methods, media and techniques for enhancing the effectiveness of teaching and learning, is essential for educational technology.

In this unit, you will learn about the meaning of educational technology, its types and scope. You will also learn about the hardware and software approaches, objectives at the micro and macro level.

1.1 UNIT OBJECTIVES

After studying this unit, you will be able to:

- Explain the meaning of educational technology
- Describe the types of educational technology
- Discuss their scope and significance
- Analyse the hardware and software approaches to educational technology
- Interpret the objectives of educational technology at the micro and macro levels

1.2 MEANING OF EDUCATIONAL TECHNOLOGY

The 21st century has been named the 'age of knowledge' and there is no way in which one can deny the role of technology in different aspects of our lives. Like other fields, education too has been deeply impacted by technological revolution. This interface of education and technology is popularly known as educational technology. Some associate the term 'educational technology' solely with technical equipment and media of education, such as overhead projectors, television, computers. There are others who believe that educational technology involves a scientific and systematic analysis of the teaching–learning process with an objective to maximize its effectiveness.

Before going further, it is essential to understand the word technology. This word is taken from the Greek word *technologia,* which means an art and is related to skill and dexterity. Generally, the term technology denotes the systematic application of the knowledge of sciences to practical tasks in industry. Technology can refer to material objects like machinery or hardware and comprise more themes, including systems, methods of organization and techniques.

In context of educational technology, Garrison (1989) opines, 'Technology will be viewed here as having both, a process (software) and a product (hardware) component, where process is the creative application of knowledge of purposeful activities. A subset of hardware is media, where media are the devices used to distribute information.' Thus, educational technology is a wider concept of the word technology. Further, it will be wrong to confuse the term teaching with the process of teaching or instructing, or educating, or provision of knowledge or engineering. This creation of education does not compromise and has very positive future prospects. For all those who are constantly engaged in the pursuit of knowledge otherwise, it will remain destructive to the welfare of free society.

Different groups and individuals have defined educational technology in many ways, over a period of time. A few of the notable definitions are as follows:

According to Finn (1962), 'Educational technology is a process, an attitude, a way of thinking about certain classes of problems.'

Lumsden (1964) arrived at two meanings of educational technology, viz., Educational Technology-I (ET-1) and Educational Technology-II(ET-II). ET-I refers to the application of engineering principles of technology to instrumentation, useful in the process of teaching. ET-II refers to the application of behavioural science to improve instruction.

The National Council for Educational Technology (1967) has defined educational technology as 'the development, application and evaluation of systems, techniques and aids to improve the process of human learning'. According to G.O.M. Leith, 'Educational technology is the application of scientific knowledge and learning and the conditions of learning, to improve the effectiveness and efficiency of teaching and training. In the absence of scientifically established principles, educational technology implements the techniques of empirical testing to improve learning situation.' According to S.K. Mitra, 'Educational technology can be conceived as a science of techniques and methods by which educational goals could be realized.'

According to S.S. Kulkarni, 'Educational technology may be defined as the application of the laws as well as recent discoveries of science and technology to the process of education.' D. Unwin has defined educational technology as concerned with the application of modern skills and techniques to the requirements of education and training. This includes the facilitation of learning by manipulation of media and methods and the control of environment in so far as this reflects on learning.

According to *Shiksha Paribhasha Kosh* (1978), educational technology has the following meanings:

(i) It is the use of those scientific theories and principles during the formulation and application of training systems, which emphasize result and experience based objectives, and are based upon educational principles to guide the education system.

(ii) Educational technology is the use of those audio-visual devices in training, which are based on modern technology, e.g., use of computer stimulators, television, radio, video-tape, etc.

(iii) It is self-training based on planned instructional material, through teaching machines.

For Association for Educational Communication and Technology (AECT) (1977), 'Educational technology is a complex and integrated process, involving people, procedures, ideas, devices and organization, for analysing problems and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning.'

According to Mitchell (1978), there are five fundamental definitions of educational technology:

(i) Educational technology I (educational psycho technology): This meaning depends upon psycho technology to enhance a learner's capability by manipulating sensory input directly or indirectly. The various problems of educational psycho technology are: assessing the capability of students on the basis of diagnoses; clarifying the objectives of education; selecting or prescribing the instructions of communication, resources or actions and assessment. It includes all methods of management of the learning processes of others, in order to achieve certain prescribed behaviours. Controlled learning is important since student is the focal point. This meaning corresponds to the professional role of learning consultant.

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(iii) Educational technology II (educational information and communications technology): This meaning stresses on the model, manufacture and assessment of training resources and communications for local or widespread distribution. Focus is on gencrating, selecting, processing and storage of information for the purpose of education and to retrieve information. This is to make knowledge more accessible. This meaning corresponds to the role of education materials provider.

(iii) Educational technology III (educational management technology): This definition stresses on organization of the resources of education. These resources include associated activities like planning, programming, budgeting, management, decision-making, operations research and system analysis. Organizational technology provides useful decision modes, information systems and organizational theory for man-machine systems. This concept of educational technology is supported by both practical and theoretical investigations. So, this meaning corresponds to management of learning resources.

(iv) Educational technology IV (educational system technology): This concept pertains to functions like setting up, outlining, constructing and evaluating educational systems. The education system developer is concerned with administration, operations, extra-mural and alternative educational systems. It may envision and execute a computer-aided system of training or design suitable courses.

(v) Educational technology V (educational planning technology): This meaning focuses on planning at the supra-institutional or national level. Non-educators are the prime occupants of this field. Their belief in alternative opportunities of education is overshadowed by economic factors related to the role played by the educational planner.

This five-fold meaning of educational technology represents the primary and central concept of educational technology. Each of these types can stand alone and yet be integral to others.

Mitchell (1978) arrived at the following consolidated definition of educational technology: 'Educational technology is an area of study and practice (within education) that is concerned with all aspects of the organization of educational systems and procedures, whereby resources are allocated to achieve specified and potentially replicable educational outcomes.'

According to the Scottish Council for Educational Technology (1979), 'Educational technology is a systematic approach to designing and evaluating learning and teaching methods and methodologies, and to the application and exploitation of media and the current knowledge of communication techniques in education, both formal and informal.'

In 2006, National Curriculum Framework (NCF) defined educational technology as the efficient organization of any learning system, adapting or adopting methods, processes and products, to serve identified educational goals. This would involve:

- Systematic identification of the goals of education, taking into account nationwide needs (like higher scalability), system capabilities and learners' needs and potential

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- Recognition of the diversity of learners' needs and the contexts in which learning will take place and the range of provisions needed for them
- Recognition of not only the immediate needs of children but also of their future needs in relation to the society for which we are preparing them
- Designing, providing for and enabling appropriate teaching-learning systems that could realize the identified goals
- Developing a range of support systems and training, enabling systemic conditions/materials and making them accessible schools
- Training teachers and students to use them
- Research existing and new techniques, strategies and technologies for solving problems of education, enabling judicious and appropriate application of technology
- Appreciation of the role of educational technology as an agent of change in the classroom, influencing the teacher and the teaching-learning process and its role in systemic issues like reach, equity and quality

Association for Educational Communications and Technology (AECT) has given its latest definition of educational technology as the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources. Mangal & Mangal (2010) opine: 'Educational technology should stand for a wise application of available human and non-human resources for providing appropriate solutions to educational problems and to improve the process and products of education.' Aziz Hap (2010) defines educational technology as the considered implementation of appropriate tools, techniques, or processes that facilitate the application of senses, memory and cognition *to* enhance teaching practices and improve learning outcomes.

The wide differences in opinion, regarding the definition of educational technology among theorists and practitioners is well explained in the above definitions. These definitions initially embraced the whole range of activities of educational technology, from the methods of psychology of learning and teaching to audio-visual communication and mass technology.

However, one can list down certain characteristics of educational technology from the above definitions:

- It is concerned with the systematic application of science and technology in the field of education.
- It adds efficiency to the process of teaching-learning within formal and informal situations.
- It includes organization of appropriate learning conditions for realizing the goals of education.
- It stresses on developing methods and techniques for effective learning and evaluation.
- It encompasses the complete teaching and learning process and is not limited to specific aspects.
- It involves input, output and process aspects of education.

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- It includes organization of learning conditions for realizing the goals of education.
- It enables and facilitates learning by control of learning situations, media and methods.
- It is not limited to the usage of audio-visual aids, but also extends to the application of psychological principles and instructional theories for improving the teaching—learning process.
- It provides procedural and practical guidance and explanation to the glitches of education.

1.3 NATURE AND TYPES

Sidney Pressey's mechanical teaching machines of the 1920s are considered to be the earliest modern forms of education through technology. Since then it has been evolving and taken many forms: Powerpoint presentations with voice-over; hypertext, i.e., V. Bush's memex in 1940s; B.F. Skinner's work that led to programmed instruction in 1950s; Computer-Aided Instruction or Computer Assisted Instruction (CAI) in the 1970s, through the 1990s and in the present scenario it has taken the form of Computer-Mediated Communication (CMC), e-tutoring and blended learning among others. However, educational technology should not be confused with teaching or instruction or learning or engineering, but it should be taken as sum total of all such aspects which go a long way in shaping the personality of the learner in a meaningful context (Singh, 2006). Further, with changes in the technology, the conception and nature of educational technology has also been adapting itself. Although the term has been in use for long now, it is still considered complex in nature. Educational technology is very versatile and comprises a cyclic procedure, a store of equipment (physical and conceptual) and a multiple-node liaison, mutually between learners and also between them and the facilitators of instructions (Hap, 2010). To understand the nature of educational technology, one needs to ascertain the objectives of educational technology and distinguish between 'technology in education' and 'technology of education'. One is also required to comprehend the components of educational technology.

Components of educational technology

S.P. Ruhela (2002) in his book, *Educational Technology*, has listed three main components of educational technology as a concept; and each component has a defined role to play in the process of education. The three components are:

(i) **Methods:** Making use of a few devices like programmed learning, team teaching, micro-teaching and personalized system of instruction as methods in teaching–learning situations.

(ii) **Materials:** Comprise instructional materials like programmed textbooks, manuals, guides, texts and other written/print materials.

(iii) **Media:** Implies employing audio or visual or both audio-visual media, such as radio, tape recorders, charts, maps, posters, films and educational television as teaching aids to supplement effective teaching and promote better learning.

Check Your Progress

1. How has Finn defined education technology?
2. Define educational technology as explained by S.S. Kulkarni.

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Besides, manpower is an essential component of educational technology, which intertwines the web of methods, materials and media. In view of this list of components, the concept of educational technology needs to be understood in the broader perspective of education. It is a comprehensive technology associated with all aspects of the educative process such as choice of methods, teaching strategies, selection of adequate/relevant learning materials, use of appropriate aids and guiding in operation/handling of various equipment to ensure better performance on the part of the learner. The AECT (1977) reports says, 'Educational technology is a broad concept encompassing teacher and learner, as well as the process and product of learning.' Educational technology functions as a mission with the prime concern of reaching a large section of the society through all possible means. Educational technology involves greater psychological and pedagogical preparedness, a scientific attitude and a coordinated approach to the educational process as whole. It reflects a professional interest and zeal for making experiments and innovations for the development and success of education.

The highlights of the nature of educational technology are listed as:

(i) It is a science of techniques and methods which can help in realizing goals.
(ii) It is an application of the body of knowledge.
(iii) It takes help from the laws and findings of psychology, sociology, engineering, and some other basic social and physical sciences.
(iv) The purpose of educational technology is to improve teaching–learning situations.
(v) It is a functional analysis of the teaching–learning process and it locates various components that operate from the stage of input to that of output.
(vi) It is dynamic and progressive in nature.
(vii) It treats school as a system of well-laid inputs, processes and output components.
(viii) It does not subsume the role of a teacher.
(ix) It is not an end in itself but a means to accomplish some laid down goals.
(x) It does not provide a solution to all types of problems, but it helps in the development of teaching and training processes of education.
(xi) It cannot be viewed in terms of its parts or processes. All branches, innovations, approaches and strategies should be integrated as a whole, according to the needs and requirements of the system represented by educational technology.
(xii) It is a technology that is continuously developing.

In essence, one can say that educational technology is applied to the teaching–learning process with the main purpose of making the system efficient and effective. In other words, appropriate use of educational technology can make the teaching–learning process efficient and effective. However, practitioners need to be careful about the use of media, methods and materials. This has been explained in NCF (2006): 'The key phrases in educational technology (ET) are appropriate technology, that is, appropriate to the task in hand for meeting specific educational objectives and the organization of all available resources into a workable system, which is checked again and again to ensure that it is appropriate and changing it where it is not working. In applying the discipline of ET to the field of education, it is imperative that the media

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choice must relate to instructional design as well as to what is available and eminently usable.'

Further, educational technology should not be considered just as subject but should be regarded as something that adds qualitative value, is relevant and appropriate. Its other attributes include transformation of education by making it dynamic and responsive and arousing curiosity and a desire to learn.

1.3.1 Objectives of Educational Technology

Accrording to Leith Educational technology has the following prime objectives:

(i) To modernize learning methods and techniques according to the changing world

(ii) To bring desirable changes in the behaviour of teachers and pupils by improving teaching, learning and evaluation conditions

(iii) To make classroom teaching clear, effective, objective and scientific

Hilliard Jason has given the following points on the objectives of educational technology:

(i) It transmits information.

(ii) It serves as a role model.

(iii) It contributes to the provision of feedback.

(iv) It assists in the practice of specific skills.

Alvin Toffler talks of 'responsible technology', acccording to which the objectives of educational technology can be as follows:

(i) To establish objectives and put together goals, in terms of behaviour.

(ii) To examine the learners' personality.

(iii) To structure the information in an order that is psychologically inclined.

(iv) To arbitrate between content and resources of presentation.

(v) To assess the accomplishment of learners, in terms of the objectives of education.

(vi) To supply feedback, among other components, for modifying the learner.

General objectives of educational technology

(i) To identify educational needs of the community

(ii) To determine the aims and objectives of education

(iii) To prepare an appropriate curriculum

(iv) To determine suitable strategies

(v) To identify human and non-human resources

(vi) To identify problems which stand in the way of development of the learner's personality

(vii) To suggest remedies to solve problems that emerge

(viii) To manage the entire educational system

(ix) To improve the process and product of education

Specific objectives of educational technology

(from the viewpoint of specific classroom teaching)

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(i) To identify the educational needs of the students

(ii) To determine the classroom objectives in behavioural terms

(iii) To evaluate and sort the content of instructions in logical or psychological succession

(iv) To plan teaching methods and strategies of the presentation of content

(v) To make use of aid material, software and hardware, mass media and communication techniques

(vi) To identify human and non-human resources

(vii) To evaluate classroom teaching, in terms of performance of students

(viii) To provide continuous feedback to students and the teacher for improving the teaching–learning process

1.3.2 Types

Technology, media and materials that are useful in the instructional process, comprise simple varieties that help teachers to develop and present their lessons more effectively in traditional classrooms. They also comprise sophisticated machines and mechanisms that completely change the structure and scenario of classroom teaching. A number of technological media and materials can be useful in both teaching and in the management of administrative data that is necessary in modern mass education. Educational technology can thus assume many forms. Often, its only aim is to make the current practices more efficient and effective. However, at times educational technology brings about pedagogical alterations. Though it can be regarded as a design science, it also tackles the basic problems related to learning, teaching and social organization. Hence, the complete use of all features of modern social science and life science methodology are captured by it. Educational technology performs the twin functions of a tool and a catalyst. The three commonly accepted types of educational technologies are: (i) teaching technology, (ii) behavioural technology and (iii) instructional technology. These are discussed below.

(i) Teaching technology

Teaching is a skill. The use of technology in teaching makes this skill simpler, specific, functional and unprejudiced. This form of educational technology rests itself on the knowledge of philosophy, psychology and science, so as to achieve the desired learning objectives. There are two important features of teaching: (i) content and (ii) classroom communication. Substance and interaction are the two factors that form teaching technology. In addition, contemporary teaching focuses on the student and not on the teacher. Thus, it needs a psychological analysis of the learner. Hence, teaching is both scientific and psychological. The system of learning assists the teacher in making right decisions. In addition, it also builds up a sense of professionalism that makes one accountable. It incorporates essential alterations in the idea of teaching, such as teacher's training, formulating the policies of teaching and management objectives of a

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teacher. Teaching technology is that form of educational technology, which is concerned with making the process of teaching more systematic.

Assumptions of teaching technology

Teaching technology is based on the following assumptions:

- The nature of teaching process is scientific.
- Teaching activities can be modified as required.
- Pre-determined learning objectives can be achieved through teaching activities.
- A mutual relationship between teaching and learning can be established.
- Proper conditions can be created for effective learning.

Characteristics of teaching technology

E.G. Vedanayagam (1988) has solicited a list of characteristics and fundamental principles of teaching technology. These are as follows:

- Teaching is a scientific process and it major components are content, communication and feedback.
- There is a close relationship between teaching and learning.
- It is possible to modify, improve and develop teaching–learning activities.
- The terminal behaviour of the learner, in terms of learning structures, can be established by appropriate teaching environment.
- Teaching skills can be developed and strengthened by means of feedback devices, with or without sophisticated techniques.
- Pre-determined learning objectives can be achieved by designing suitable teaching activities.
- The use of achievement motivation technique enhances the output of a teacher and a learner.

Technology is a rapidly changing area of the curriculum. For experienced teachers as well as students and novices, technology has evolved the need for a whole new range of knowledge and skills in teaching. Ivor K. Davies (1971), in his book, *Management of Learning*, has presented the contents of teaching technology in four steps— (i) planning of teaching, (ii) organization of teaching, (iii) leading by teaching and (iv) control of teaching. These are discussed in detail, as follows:

(i) **Planning of teaching:** Within this phase, the teacher examines the subject matter, decides upon and describes learning objectives, and puts these objectives clearly in writing. The following three activities are performed by him, as part of this phase: (a) task analysis, and (b) identification of the aim of teaching, (c) noting down learning objectives. As quoted by I.K. Davies, 'in teaching, planning is the work a teacher does to establish learning objectives'.

(ii) **Organization of teaching:** In this stage, an effectual atmosphere is created by the teacher. This is done through the selection of teaching techniques, approaches, procedures and vital benefits.

(iii) **Leading by teaching:** In this stage, the teacher is a source of motivation for the students. They show interest in the teaching and learning objectives in every phase of this stage. I.K. Davies wrote, 'leading is the work a teacher does to motivate, encourage and inspire students, so that they readily achieve the objectives of learning'.

(iv) **Control of teaching:** In this stage, there is no change in prearranged and described purpose of learning. This stage does not comprise the introduction of any change. However, the prospect is reviewed by the teacher, so that the predefined goals can be achieved. For accomplishing this impressive task, support is sought by the teacher through different techniques of validation and measuring of dimensions. If the teacher comes to the conclusion that the learning objectives have not been accomplished, then it is the teacher's duty to bring essential modifications in the organization's behaviour.

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(ii) Behavioural technology

Behavioural technology is a vital constituent of educational technology. It emphasizes that psychosomatic values be used in learning and teaching. The motive is to change the behaviour of the teachers and pupils to match with the objectives of teaching. This form of educational technology is dependent on psychology. Behaviour is the focus of the process of education and learning with their objective to bring persistent changes. Different learning experiences are shared with learners to bring desirable changes in their behaviours. Here, behaviour would mean the cognitive, conative and affective activities of an individual. Behaviour technology, as a form of educational technology, is utilized to study and bring modification in the behaviour of all learning organisms. B.F. Skinner popularized the usage of this term while making use of his 'theory of operant conditioning'. He used the theory to bring desired modifications in the behaviour of learning organisms. In the area of learning and education, behavioural technology focuses on the behaviour of teachers. Hence, it is sometimes also referred to as 'training psychology'. In schools, the task of behavioural technology has become almost synonymous with behaviour analysis and behaviour modification, carried out through the principles of operant conditioning and observation learning. In other words, behavioural technology focuses attention on the use of principles that have a psychological orientation in the processes of learning and teaching. This works to alter the behaviour of the teachers and pupils to match it with the mode of teaching. Behavioural technology is aimed at boosting the growth and development of behaviour and learning. It employs the following to transform the behaviour of a teacher:

- Definition of teacher-behaviour
- Doctrines of teacher-behaviour
- Observation technique of teacher-behaviour
- Study and nature of teacher-behaviour
- Assessment and standards of teacher-behaviour
- Prototypes of teacher-behaviour
- Different tools to develop teacher-behaviour such as: programmed instructions, T-group training, interaction analysis techniques and simulated training of social skills

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Suppositions of behavioural technology

Behavioural technology is based on the following suppositions:

- A teacher behaves socially and psychologically.
- A teacher's behaviour can be observed.
- A teacher's behaviour can be measured.
- A teacher's behaviour can be modified.
- Everyone is not a born teacher.
- Teachers can also be made.

Salient features of behavioural technology

Some of the important characteristics of behavioural technology are:

- The basic function of behavioural technology is psychology.
- Strength and responses are strongly focused on behavioural technology.
- The teaching acts are appraised from a purposeful viewpoint in behavioural technology.
- Behavioural technology emphasizes on psychomotor goals.
- Behavioural technology is in terms of the software approach.
- Behavioural technology is widely practised training institutes of teachers.
- The attention of behavioural technology can be based on individual differences between students and teachers.
- Behavioural technology is focused on the elements and direction of behaviour in a classroom.

Behavioural technology would help practitioners to know the nature of the existing behaviour, the nature of the target behaviour, and the ways and means to meet gaps between existing and target behaviours.

(iii) Instructional technology

The evolution of a technology occurs when scientific learning and communication are used in teaching. When physical sciences interact with education, we are provided with traditional support, gear, materials like paper, ink, books, radios, films and televisions and more refined progressive hardware like, computers, space satellites, and language laboratories, etc. Stoluraw (1963) stressed on the theory of existence of three most important factors that are focused on the association of instruction and technology: (i) population explosion of the world, (ii) exponential pace the spread of new knowledge, and (iii) scientific and technological changes in our present social structure. Robert A. Cox defined the technology of instructions as 'the application of scientific process to man's learning conditions.' E.E. Haden opined, 'Instructional technology is that branch of educational theory and practice, concerned primarily with design and use of messages which control the learning process.' The definition given by Unwin (1969) described instructional technology as: 'The application of modern skills and techniques to requirements of education and training (instruction). This includes the facilitation of learning by manipulation of media and methods and the control of environment.'

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Another popular and accepted definition has been given by S.M. McMurin (1970): 'Instructional technology is a systematic way of designing, carrying out and evaluating the total process of learning and teaching, in terms of specific objectives based on research, human learning and communication. It employs a combination of human and non-human resources to bring about the more effective instruction.' AECT has defined instructional technology as, 'the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning'.

In the present scenario, instructional technology is broadly necessitated to establish a progress in teaching, in learning and in the process of evaluation. This form of educational technology is meant for helping the instructor and the learner in the desired instructional task for the realization of stipulated instructional objectives, in a particular teaching–learning situation. In other words, focus is on developing the instruction process.

Assumptions of instructional technology

The fundamental assumptions of instructional technology are as follows:

- A student is able to learn in accordance with his requirement and capability.
- A student can learn even if the teacher is not present.
- One can augment a particular instruction by its continuous use.
- Instructional objectives can be achieved with the help of learning objectives.
- The area of discussion can be segregated into different sectors or parts, and every part can be taught in an independent way by use of this technology.

Unique features of instructional technology

Following are the characteristics of instructional technology:

- Instructional technology helps a lot in the achievement of reasonable goals.
- Instructional technology can make teachers more efficient.
- When supported by instructional technology, the students can learn in accordance with their requirement and speed of grasping.
- Instructional technology has control over individual disparities.
- Instructional technology also uses the theory of conditioned response.
- A more detailed examination of subject matter is carried out with the help of instructional technology, which motivates optimism, pertaining to the remarkable manner in which the contents are presented.

Instructional technology suggests many tools, techniques and knowledge which are used in designing and delivering results. Together they provide useful means towards accomplishing educational objectives. It is important to know and be responsive to:

- The destination of delivery of instructions.
- The tools and techniques available to deliver instruction.
- The right time to use these tools.
- Design and delivery of successful learning experiences.
- Proper distribution of content and methods.

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- The best place to deliver instruction.
- Ensured meeting of expectations.
- Revision techniques, in case instructions are not met.

The field of instructional technology will only grow if technology improves. The use of technology will help the delivery of education in an efficient manner, by overcoming the limitations and problems faced by the education sector. This form of educational technology is gaining popularity because instructional technologists claim to achieve effective learning by investing less time and cost, than through other means.

The main points of difference between three types of educational technologies (behavioural technology, teaching technology and instructional technology) are listed in Table 1.1.

Table 1.1 *Comparison of Three Types of Educational Technologies*

Aspect	Teaching Technology	Behavioural Technology	Instructional Technology
Exponents	I.K. Davis, Hunt, Morrison, Herbart	B.F. Skinner, Flander, Ober, Amidon	Lumsdan, Bruner, Asubel, Glaser
Purpose	Development of cognitive, affective and psychomotor domains	Development of cognitive, affective and psychomotor domains	Development of cognitive domain
Base	Philosophy, psychology and science	Psychology	Psychology and science
Approach	Hardware and Software	Software	Hardware
Focus	Teaching	Teacher	Instruction
Application	For making classroom teaching purposeful and effective	For producing effective teachers	Self-study, correspondence, remedial study

1.4 SCOPE AND SIGNIFICANCE

The scope of any subject means the jurisdiction, limits or boundaries of its operation. Similarly, educational technology needs demarcation of boundaries within which the process of education can go on. As has already been acknowledged, educational technology is concerned with bringing about an improvement in the teaching–learning process. It is an applied or practical study which aims at maximizing educational effects by controlling different types of confounding variables. Thus, educational technology is a broad concept that has a wide application. The National Policy on Education (1986) recommends: 'Educational technology will be employed in the spread of useful information, the training and retraining of teachers, to improve quality, sharpen awareness of arts and culture, include abiding values, etc., in both, formal and non-formal sectors. Maximum use will be made of the available infrastructure.'

According to S.S. Kulkarni, the scope of educational technology is: (i) to analyse teaching-learning, (ii) to evaluate the functions of the components of teaching-learning, and (iii) to interpret these components in such a way that effective results can be achieved. In narrow sense, educational technology means a little more than the use of sophisticated hardware in teaching, including overhead projectors, tape recorders, televised films, cassettes, videodiscs, and gramophones. On a broader scale, it may be interpreted to mean the use of any new technique or method of teaching. Drawing on the same and other related definitions, the scope of educational technology can be encapsulated in the points discussed below.

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3. Identify at least two objectives of educational technology as defined by Leith.
4. Name the different types of educational technology.
5. What is behavioural technology?

- **Analysis of teaching and learning process:** Educational technology attempts to discuss the concept of teaching. It also analyses the teaching process, variables of teaching, phases of teaching, levels of teaching, theories of teaching, principles and maxims of teaching, the concept of learning, theories of learning, relationship between teaching and learning, and application of different concepts in specific classroom activities. It optimizes learning and attains optimum educational objectives.
- **Determination of objectives:** Writing objectives in behavioural terms is an essential task for carrying out the process of education. Educational technology has provided different methods and techniques for writing instructional objectives in behavioural terms. The RCEM (Regional College of Education, Mysore) approach, Bloom's Taxonomy and other similar ones have provided options to teachers for setting objectives in their own style, according to their specific needs. The adaptation of the objectives to the changed environment and altered circumstances has been enabled by the use of educational technology.
- **Development of teaching–learning materials:** Teaching–learning materials are an important aspect of the teaching–learning process. Educational technology has contributed to the production and development of suitable teaching–learning material, in view of predetermined objectives, designed curriculum and accessible resources. This covers the techniques of developing software and instructional material like programmed learning material, personalized system of instruction, material for mass education, computer assisted learning material, and material for open university courses.
- **Development of teaching–learning strategies:** Educational technology has tried to describe ways and means of discovering, selecting and developing suitable strategies and tactics of teaching, keeping in mind the different circumstances, the available resources, and other factors. Progressive development of different teaching models and methods has always equipped the teacher with newer teaching–learning strategies.
- **Teacher training:** Educational technology takes into consideration all aspects of the teaching–learning process. Teachers are one of the important aspects for those working in the field of educational technology. The subject has, therefore, been inclined towards the purpose of preparing teachers and has evolved techniques like micro-teaching, Flanders' interaction analysis, and simulated teaching, for teacher education programmes.
- **Development of curriculum:** An appropriate and well-balanced curriculum is the backbone of education, for any group of learners. As new technologies are created, knowing successful strategies for developing and transferring educational material becomes increasingly important. Educational technology can dwell on suitable frameworks, learning experiences, and innumerable factors associated with the development of appropriate curriculum, as per the societal needs.

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- **Usage of audio-visual aids:** The selection of appropriate audio-visual aids greatly enriches the teaching–learning process. Educational technology discusses at length, the different facets of audio-visual aids, for example different types and rules governing their selection, development and production, their storage and retrieval and consideration about their applicability, cost-effectiveness and efficient deployment in learning situations.
- **Development and utilization of mass media:** Educational technology has a huge application in educating a large section of people and imparting a large amount of knowledge in a limited span of time. With reference to this, the mass media, i.e., television, radio, newspaper, and other modern technologies like computers and information technology (e-mail, Internet, etc.) has a lot of scope. The illiterate masses can be educated with the help of innovative methods and practices of teaching and learning.
- **Historical information:** Any branch of knowledge that we deal with has a historical base. Such information holds tremendous importance for students to understand any branch of knowledge in its totality. When such incidents occur, they can be recorded on audio/video CDs or documented in the form of written or printed material. Such documents become the source of information for learners. Educational technology has enabled teachers to store such historical information and transmit it to next generation learners. Thus, education technology helps in collection, storage and retrieval of information.
- **Gaming and simulation:** Educational technology provides the option of going through historical events, which is either costly or hazardous and cannot be done through simulation. Computer technology plays a main role here. It can provide a lifelike picture of the phenomena, in different dimensions. Education technology can also show the operation of different parts of a phenomenon and the consequences. The other possibility is games. Through gaming, children can learn many concepts that cannot be taught in the formal setup of a classroom. Besides exhibiting their benefits for children, gaming and simulation have also proved to be useful in the training of teachers at both pre-service and in-service levels.
- **Distance education:** Educational technology has a great scope in distance education and open school programmes. In the present scenario, there is a great need for personnel training and education on regular basis to keep one updated in the field of work. On the same lines, distance education programmes, a relatively less formal process of education, have acquired an important status. Educational technology, with its innovative practices, can educate learners who cannot attend classroom sessions for their education. In this regard, programmed learning materials, modules, contact programmes, and counselling are some innovations that can help distance learners. This has made higher education accessible to the masses.
- **Appropriate tools, techniques and processes:** Techniques and processes have proved their value in the field of education. Teachers have come up with methodologies to fulfil tasks and obtain the targeted learning outcomes. The refinement of these techniques is a continuous process, similar to continuous developments in technology. Here, it is inevitable to understand that the employed technique should be appropriate; even though the most expensive technology is used, it may not add any value to education.

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The above discussion endorses the fact that educational technology is concerned with all variables, phases, levels and aspects of the teaching–learning process. In fact, the scope of education technology cannot be confined to narrow boundaries. The expansion and development of the subject matter would further aid in improving the teaching–learning process. Thus, educational technology is a concept that is expanding continuously.

Role and significance of educational technology

The impact of extraordinary developments in the field of information and communication technology (ICT) has been the strongest on education. The advent of the new millennium brought with it the awareness of being part of one of the most spectacular revolution of technology. This revolution of technology is most focused on the areas of information technology, communication and multimedia. In general, it signifies the start of an information society and, therefore, plays a key role in attributing education to every aspect of life. The purpose of educational technology is also to promote efficiency of education by improving the quality of teaching, of educational administration, and of educational research. Some more examples of significant developments in this direction are given below.

- **Wider participation:** Technology has made it feasible for education to reach across to wider audience. This is, especially, relevant for Indian conditions, where the limitations of geographical, economic, physical and social nature exist. The expansion of distance education at both, school and higher education levels has helped in increasing the educational status of the country. Educational technology has assumed an important role in expanding the services of open education through institutes like, National Institute of Open Schooling (NIOS) and Indira Gandhi National Open University among others.
- **Empowerment of learners:** In traditional terms, a learner takes up a course through a schedule of classes that are conducted at fixed venues, on fixed days. The teacher or coordinator decides the speed and frequency of the classes. The students' requirements and mental levels are assumed by the teacher. Nevertheless, different learners have different capacities of grasping. Every person is not adapted to typical classroom sessions. Learning can be transmitted in a number of ways by the use of technology. Some learners find reading convenient while others prefer audio-visual presentations, group discussions and other interactive means. Technology offers learners the choice to access course material through different media, depending on their preferences. Technology can deliver learning in a way that is most suitable for the individual such that every learner can enjoy a unique learning experience.
- **Facilitate application of senses, memory and cognition:** Learning needs to be understood as a technique to demonstrate ability. This is in consonance with Bloom's Taxonomy, in which a blend of mind and body summarizes the outcome of learning. However, the wants of human abilities are not sufficiently fulfilled by modern teaching and learning conditions. This process is facilitated by

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technology, for example, a learner can understand the universe through video facilities, or make use of the Internet to learn about that which is beyond his /her physical reach

- **Differentiated instruction:** Educational technology calls for active participation of students to use different strategies of questioning. It makes individual instructions more generic and propels the growth of personal learning strategies. There is ample motivation for learners to use different aspects of multimedia and make creative use of the knowledge gained by them.
- **Enhance teaching practices:** In the formal system of education, learning can never happen in isolation. This means that only by making information and resources accessible to learners, we cannot consider the job as done. Practically, our system of education runs on the belief that the progress of the learner will be quicker when the person is guided by a teacher (skilled instructor). Educational technology assists and supports teachers in the teaching–learning process.
- **Improve learning outcomes:** Technology, newer methods, incentives, policies; everything planned for education would be a waste if the learning outcomes are not improved. If new technology fails to bring about betterments, then its use should be discontinued. Hence, educational technology involves continuously trying out and exploring newer technologies, such as intelligent classrooms, podcasts, Internet and laptops. These efforts are directed at making gradual changes in techniques and removal of defects. Educational technology has thus, enabled the teachers to improve learning outcomes.
- **Continuing education (lifelong education):** The rapid explosion of knowledge has made it necessary for an individual to learn throughout his life. Continuing education (*nirantar shiksha*) is absolutely necessary for improving the quality of one's life. This has been made possible only through use of educational technology.
- **Multiple learning resources:** Traditional teaching conditions had limited learning resources, but technological revolution has made it possible to present multiple learning resources to the learners easily. Now, we find that a computer not only presents visuals but also speaks to the learner. We also come across many innovations in the field of telecommunications.
- **Rapid adaptability of learning resources to learner's needs:** Generally, learning resources available to learners were mostly impersonal (e.g., a static textbook). These do not change according to the needs of a learner, at different stages of learning. The changes in computer-linked learning resources, as well as methods emerging out of new cognitive psychology and group dynamics stream facilitate learning in different abilities. More and more integrated innovations in educational technology are taking place, and designers of the instructional system are rapidly incorporating newer developments in the field. Programmed learning and personalized system of instruction are examples of the same.
- **Solving the problems systematically:** Educational technology is a continuous and comprehensive programme, providing a scientific basis to the education system. It can work to remove intrinsic shortcomings of the system. This can be done by use of demonstrations that are regularly broadcasted, or through documents designed for pupils. Educational technology can make the operation of schools slightly flexible. Nevertheless, it cannot be considered as a miraculous solution for all problems in the educational system.

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- **Professional development of teachers:** Educational technology offers a number of possibilities for continued professional development of teachers. In the changing scenario, the teacher cannot suffice with the pre-service education that he/she has received. They need to continuously update themselves with newer information and methods. Educational technology in its different forms has enabled teachers by providing them with options like distance education, e-learning, online learning and other similar forms of alternative education.
- **Communication and support:** Communication is the backbone of any form of teaching–learning situation. Educational technology has proposed several systems of communication for both formal and non-formal learning situations.
- **For preservation of knowledge:** Modern electronic gadgets provide tremendous capabilities to preserve knowledge/information for future use, including print media. Information can be preserved in the form of audio-video programmes, computer software, videodiscs, etc., and retrieved when required. Thus, bulk of the information can be preserved electromechanically, for instance, a videodisc is capable of preserving a complete set of encyclopaedia.
- **For transmission of knowledge:** Use of modern media in education can reach and teach students in any part of the globe. Radio and television broadcasts can reach large number of students in different parts of the country. Almost the entire country can be covered simultaneously through radio or television networking systems. Communication satellites have added to the effectiveness and efficacy of communication at a distance, and made it possible to link more than one location and more than one group of students through two-way talkback system.
- **Optimum use of resources:** The idea behind educational technology is not maximization of resources but appropriate use of the resources available. It should be understood that educational technology is not an end in itself but a means to accomplish some educational and instructional objectives, already determined and clearly defined. The objective is to make the whole teaching–learning process more meaningful and effective for both learners and teachers.
- **Future prospects in education sector:** Career has become a priority for students nowadays. For the development of their career, substitute means of education such as distance and open learning, education on demand and other such flexible models are necessary. This again emphasizes the role of educational technology in the teaching–learning process.

Educational technology is enabling multi-modal teaching, changing curricula and spawning rich forms of online research and collaboration. Exceptional prospects of growth have been created by continuous advancements in educational technology. This has deeply impacted the teaching capacity of teachers and the learning capacity of learners. To develop a new learning culture, it is imperative for teachers to gain expertise in ICT skills and their utilization. The amalgamation of technology should be driven by effective learning. This makes it necessary to be in synchronization with technological developments to build practicable solutions. Although, the availability of tools is in abundance, the ability to use them for improving the learning experience should be clear.

Moreover, when educational technology develops, it will give rise to the prospect of creating and recreating new types of educational institutions in future. It would help in reducing wastage of both physical resources and human resources to a minimum. Further, educational technology has value only to the extent that it actively assists learners in obtaining knowledge and skills, as has been in the *Encyclopaedia of Education*. The *Encyclopaedia of Education* mentions: 'Whether any particular device is functionally more efficient than any other will depend primarily upon whether the device is compatible with the dynamics of the learning process, the prior experience of the learner with the body of materials to be presented and the learners' physical, attitudinal and motivational preconditioning for use of hardware, software and the particular response mode of the equipment.'

In essence it can be said that educational technology can contribute to qualitative as well as quantitative improvement of education. There is a silver line to this aspect as observed by the International Commission on Education (1973), 'Educational technology is not just an apparatus to be clamped on to a conventional system, to add or multiply traditional procedures. It can only be of value if it is really integrated into the entire system and if it leads us to rethink and renovate it.'

Schools still need to go a long way in exploring the depth of educational technology. Educators now view technology as a means to explore and create. Even students, who are not doing well, can improve and succeed with the help of educational technology. It develops self-esteem and transforms the reluctance to learn into motivation. Students are empowered through multiple and convenient means of learning and a learning environment that is psychologically stable.

1.5 HARDWARE AND SOFTWARE APPROACHES

Professor Henry Ellington (1993) opined that the key function of educational technology is to bring about improvements in the general competence and efficacy of the teaching—learning process. He further said that these improvements can be introduced by:

(i) Enhancing the quality and capacity of learning.

(ii) Reducting of the turnaround time for learners to achieve the assigned objectives

(iii) Making teachers more efficient.

(iv) Cost-cutting without compromising on quality.

(v) Making learners capable of taking their own decisions.

(vi) Providing education in more flexible ways.

Considering educational technology as multifaceted in nature, Lumsdaine (1964) has listed its three distinct approaches:

(i) Educational technology I (ET1) or the hardware approach

(ii) Educational technology II (ET2) or the software approach

(iii) Educational technology III (ET3) or the systems approach

Check Your Progress

6. What are the scopes of education technology according to S.S. Kulkarni?
7. What is the purpose of education technology?

Hardware approach

The hardware approach implies the use of mechanical materials and equipment in the domain of education. Audiovisual aids like charts, models, filmstrips, slides, audio cassettes and sophisticated equipment and gadgets like films, projectors, radio, tape recorder, record player, television, video, teaching machines, and computers, fall in the category of hardware. The hardware approach is based on the application of principles of physical sciences and engineering to education and training. In this system, the teaching process is being mechanized gradually so that maximum pupils may be educated in minimum time and at low costs. This approach is a by-product of the scientific and technological developments of the 20th century.

It is to be noted that teaching machines are the only mechanical aids deliberately designed and invented to fulfil instructional requirements. All other audiovisual aids were designed and manufactured for improving the communication system, but now they are being used for instructional purposes.

Mechanization is being introduced for preservation, transmission and advancement of human knowledge. For instance, a teacher can deal with a large group of students by his discourse on radio or television. Thus, educational and training systems are able to deal with an increased number of students and the cost per student has been reduced by the hardware approach to education. Silverman (1968) referred to this type of educational technology as 'relative technology'. This comprises borrowing and applying technology, machines and devices in the process of teaching and learning. In this context, educational technology serves a simple 'service' function in education.

Ivor Davies (1978) calls this approach the 'audiovisual archetype'. This approach stresses on the employment of machines, devices, equipment and similar instructional aids. This approach focuses on the teacher and his/her teachings. Technology is seen as a means of mechanizing or automating the process of teaching with devices that transmit, amplify, distribute, record and reproduce stimuli materials and thus, increase the teacher's impact, as well as widen potential audience. The media had developed this approach during the 1930s. It gained prominence during the post World War II period. According to Davies, this 'audiovisual archetype' considers audiovisual hardware to perform functions like supporting classroom presentations and improving demonstrations by giving access to reality or simulations of reality. It is not possible for a teacher to come up with these, within a short span of time. Nevertheless, this approach has faced several criticisms for the lack of coordination in its application.

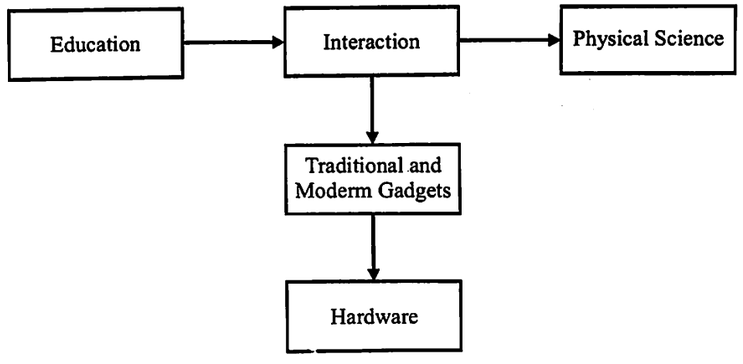


Fig. 1.1 The Hardware Approach

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Characteristics of hardware are as follows:

- Hardware components are generally electronic and mostly depend on mechanical systems.
- New techniques and researches are being conducted to evaluate the effect of hardware.
- The outcome of hardware is direct and immediate because of its concrete form.
- Hardware components are the media of communication.

Software approach

The software approach or software technology of education owes its origin to behavioural sciences and their applied aspects concerned with the psychology of learning. It originated from the engineering efforts of Skinner and other behaviourists. According to Arthur Melton (1959), software teaching is directly related to psychology of learning, which comprises behavioural changes resulting from experience. This view of educational technology is associated with modern principles and theory of teaching, models of teaching, theory of instruction, and theory of teacher—behaviour and principles of programmed learning. The components of software technology are closely associated with the modern principles of programmed learning, such as:

- Task analysis.
- Writing objectives in behavioural terms.
- Selection of appropriate instructional strategies.
- Reinforcement of correct responses.
- Constant evaluation.

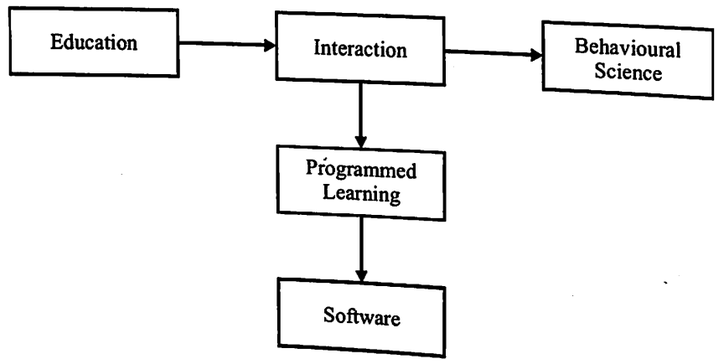


Fig. 1.2 The Software Approach

Leith observed that educational technology is the application of scientific knowledge about learning and the conditions of learning to improve the effectiveness and efficiency of teaching and learning'. Silverman (1968) termed software technology as constructive educational technology due to its constructive nature. Its basic educational applications are in the analysis of instructional problems, selection or construction of measuring instruments required to evaluate instructional outcomes and construction or selection of strategies and tactics to produce desired educational outcome.

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Ivor Davies, names this approach as the 'engineering archetype', which applies the principles of behavioural science for the betterment of learning. Despite the use of hardware, this approach focuses on the learner and the learning. Therefore, it is called the software approach. 'Technology is seen as a means of providing the necessary know-how for designing the new, or renewing the current, worthwhile learning experiences. Machines and mechanization are merely viewed as instruments of presentation or transmission' (Davies, 1978).

It was in early 1969 that software approach was developed in the area of programmed learning. It was the outcome of Skinner's efforts on operant conditioning. In the beginning, this approach found its application in the design of materials having sequential content. Soon the it was widely used as part of curriculum and for developing courses. Based on the engineering approach, it takes the form of a series of steps to be followed. These steps comprise a statement of inputs and definition of objectives, intermediate steps which examine and select instructional strategies and resources and a terminal step of evaluation and output. This process always includes feedback. Though conventionally, ET1 went aboard after ET2, it is not to be regarded as a successful version of ET1. The development of both versions was independent and they still exist.

***Table 1.2** Differences between Hardware and Software Approaches*

Hardware approach	Software approach
Hardware approach has its origin in physical science and applied engineering.	The origin of software approach is in behavioural science and its allied aspects concerning the psychology of learning.
It refers to the application of the principles of physical sciences or engineering and technology, in the development of electro-mechanical equipment used for instructional purposes.	It refers to the application of teaching–learning principles to direct and deliberate shaping of behaviour.
It tries to adopt a product-oriented approach.	It tries to adopt a process-oriented approach.
It helps in better communication of educational purposes. It makes teaching effective by mechanizing the teaching–learning process. It increases the efficiency of educational means and reduces the cost of education.	It contributes to increase the efficiency of teachers as well as learners. However, it lags behind in reducing the cost of education.
It comprises charts, models, slides, filmstrips, audio cassettes, sophisticated equipment and gadgets like television, film projectors, tape recorders, record players, videos, teaching machines and computers.	It comprises modern principles and theory of teaching, models of teaching, theory of instruction, theory of teacher behaviour and principles of programmed learning.
Hardware technology is concerned with production and utilization of audiovisual aid material, sophisticated instruments and mass media for helping teachers and learners to achieve better results.	Software technology tries to exploit the psychology of learning for production and utilization of software techniques and material in terms of learning material, teaching–learning strategies, tools of evaluation and other devices.
Hardware is of no use without a suitable software that governs its working. It needs the services of software technology for its functioning.	Software approach makes the hardware functional.
Hardware is prepared by assembling different gadgets. The same hardware can be used in different fields like industry, entertainment, education and corporate sector, etc.	Silverman termed educational technology as 'constructive educational technology'. It concentrates on the analysis, selection and construction of whatever is necessary to meet only educational requirements.

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Thus, we may conclude that while the hardware approach originated from physical sciences and applied engineering, the software approach owes its inception to behavioural sciences and their applied aspects concerned with the psychology of learning.

Significance of software and hardware

The significance of software and hardware in education are as follows:

- They cater to individual differences of students.
- They contribute to the economy of time, energy and resources of teachers and students.
- They bring clarity and vividness to the subject matter.
- They help to motivate students.
- Their help in developing and sustaining the interest of the students.
- They make the subject matter interesting, attractive, inspirational and effective.
- They provide for active participation of students.

These aspects of educational technology are closely intertwined to serve the cause of education. Hence, a clear demarcation between their constituents is difficult. For every hardware, there is corresponding software, as shown in Table 1.3.

***Table 1.3** Educational Hardware and Corresponding Software*

Hardware	*Software*
Overhead projector (OHP)	Overhead transparencies
Slide projector	Slides
VCR and monitor	Video programmes
Computer	Computer programmes
Blank paper	Written matter

It needs to be clarified here is that Table 1.2 is not an exhaustive list, but only a suggestive list of components. The list is endless and continuously growing owing to the rapid technological developments taking place and even faster adoption of these newer technologies in teaching–learning situations. What needs to be borne in mind is that with the development of new technologies, the older ones still occupy an important place in our educational system.

1.5.1 Technology in Education and Technology of Education

Education today has grown in leaps and bounds. Technology has made learning easier for both teachers and students. The developments in technology are not limited to gadgets and appliances used by people daily, but they have reached schools and classrooms. In this connection, there are two phrases which are popularly and often interchangeably used—technology in education and technology of education. Though they sound similar, they are different.

Technology in education refers to the use of technological hardware in education. Here, more importance is given to the media used for carrying a message. It is mainly concerned with electrical and electronic gadgets, which are used to facilitate the teaching–learning process. This is a constantly evolving field that depends upon

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technological advancements. It involves the increasingly complex range of audio-visual equipment, hardware and sophisticated electronic devices like projectors, films, television, tape recorder, teaching machines, teletext and computer–aided instruction for individual and group learning. The use of technology in education has many advantages, just as technology has enriched every aspect of life. Technology in education is not limited to make learning and imparting of education easier in every possible way. It is also a field of study in itself for those who are involved with developing technological tools for educational purposes.

It is always advantageous to use technology in education because it helps both teachers and students to gain knowledge in a quicker and better way. Technology in education will be useful if it is properly planned and organized on psychological and pedagogical principles. Technology in education serves the following purposes:

(i) Supplies the needed appliances, equipment and mass media for accomplishment of different purposes and functions of education.

(ii) Facilitates in training the teachers to handle and make the finest use of equipment.

(iii) Develops a positive attitude among teachers and learners towards these appliances.

(iv) Signifies the relevance and use of the appliances in the context of individual and group learning, to achieve the goals of formal and informal learning.

Technology of education can be referred to as a purposeful utilization, in combination or separately, of objects, techniques, devices, events and relationships to increase the effectiveness of educational purpose. It deals with applying the resources of technological knowledge in an organized way, through which every individual has to pass, for acquiring and using knowledge. It governs the involvement of educationists in the design and evaluation of systems of learning, involving an understanding of the psychology of learning, communication and information theory. It signifies a technological approach to the system, issues and problems of education. This approach characterizes the methodology appropriate to learners' needs, learning objectives, the process of learning and teaching, as well as availability of resources. Technology of education includes technology in education, as shown in Figure 1.3.

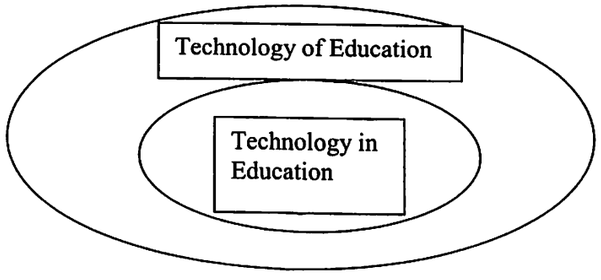


***Fig. 1.3** Technology in Education as a sub-set of Technology of Education*

Technology of education also includes decisions about different aspects of education like determination of educational objectives to be achieved, the size of learning groups, learning sequence, teaching methods and selection of media. It also comprises the appropriate use of media, knowledge, ideas, human and non-human

resources in systematic planning, designing, production, management and evaluation of the educational process. In other words, it includes the entire process of setting goals, continuous renewal of curriculum, trial and use of new methods and materials, evaluation of the system as a whole and resetting of goals in view of changing circumstances.

Saettler (1978) distinguishes between technology of education and technology in education. According to him, the former is a behavioural science conception, whereas the latter is a machine (device) conception of educational technology. Radio, television, OHP (overhead projector), computer, and tape recorder, constitute technology in education. On the other hand, programmes on radio and television, computer programmes and OHP transparencies that are based on scientific knowledge of education, constitute technology of education.

1.5.2 Electronic Resources

Electronic resources have also made their foray into the field of education, in the last century. In 1920 it was the radio, and in 1950 the television began to be used widely as educational tools. The usage of radio and television in broadcasting for education has assumed three general approaches:

(i) *Direct class teaching:* Where temporarily, teachers are replaced by broadcast programming substitutes

(ii) *School broadcasting:* Where complementary teaching and learning resources are offered by broadcast programming

(iii) *General educational programming:* Which offers general and informal educational opportunities.

Radio

Radio basically transmits signals through free space enabled by modulation of electromagnetic waves having frequencies lower than visible light. This is done by oscillating electromagnetic fields that pass through air and the vacuum of space, which makes electromagnetic radiation travel. By systematically changing (modulating) some property of radiated waves, such as amplitude, frequency, phase, or pulse-width, information is carried from one place to another. The oscillating fields induce an alternating current in the conductor, when radio waves pass an electrical conductor. This can be detected and transformed into sound or other signals that carry information.

According to Butcher (2003), radio has been used in education ever since its availability. Pennycuick (1993) of the Centre for International Education at the University of Sussex, states more specifically that interactive radio instruction (IRI) is characterized by 'highly coordinated' instructional materials and delivery strategies. It includes elements of active participation on the part of the students. In spite of technological advancements, radio remains the key media to which most rural people have access. Educational radio initiatives in different developing countries were effective in providing topical programmes and reaching large numbers of learners rapidly. Further, radio broadcasting is one of the greatest educational tools, which has ever been placed at the disposal of civilized man. It is an instantaneous and universal means of communication. Broadcasting is relatively new, as far as its age is concerned. However, in a short period, it has been determined definitely that it can perform three

separate functions— (i) it can sell goods and services; (ii) it can provide entertainment; and (iii) it can make education, culture and information available. Radio can be educative in formal as well as informal situations. The medium of radio is very effective for broadcast of lectures by eminent educationists, scientists and historical statements. It is a rich medium for broadcast of drama, stories, commentary, sports news, educational news and educational programmes. It is popular in both urban and rural settings. Radio programmes are generally prepared on topics which are more suitable to verbal communication. In India, the all India Radio (AIR) and other radio channels render valuable assistance to classroom instructional programmes. The limitations of radio broadcasting are:

- It uses only the sense of hearing.
- It is one-way communication.

Television

Education television excels as a medium of large-scale delivery of information. In the modern times, television is an integral part of the culture. TV provides entertainment, news, education, culture, weather, sports, etc. It is the most powerful medium of mass communication that has ever existed and it has revolutionized our life in many ways. It appears that the future television is going to have definite positive contribution to make children's life in the classroom happy. Television is already widely being used in schools. It is a powerful medium of communication that calls for the use of auditory as well as visual sense of learners in receiving education.

Television offers many benefits to children and learners in general, including:

- It enables the sharing of cultural experiences and thus, brings the world closer.
- In the Indian setting, specifically where togetherness is valued, shared viewing of programmes gives the family members of all ages, an opportunity to spend time together.
- Television can be used by parents as a catalyst to get children into the habit of reading. This can be done by following up televised programmes through books on same subjects.
- Exhibiting social responsibility, television can spread cultural and family values in an implicit manner.
- Television programmes provides an opportunity to parents to explore and discuss controversial or sensitive issues with children.
- Learning skills and even socialization of young children can be developed through balanced and efficient use of educational programmes.
- Young people can become more aware of other cultures and people through news, current events and historical programming.
- Documentaries can give rise to judgmental thoughts concerning society and the world.
- The world of art and music can be opened for people by cultural programming on television.

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- Televised instructions have the potential of improving the process and products of learning as they involve thorough planning, systematic presentation and integration of a wide range of audiovisual material and appliances.

Television is an important aid to teachers, supervisors and educational planners. It has been utilized for informal and formal education and for distance and correspondence education. There are some limitations associated with television in the form of one-way communication, impersonal nature, passive learning, no interaction, and expensive media.

India, like other developing countries, has been using television for enriching and improving the quality of education at every level. It has been particularly used for expanding educational facilities, particularly in rural and backward areas, for normal and informal systems. New dimensions have been added to the use of television for instructional purposes with the advent of satellites. So far there has been use of open circuit television in India. Closed circuit use of television for educational purposes has not been explored much. Closed circuit television broadcasting is a sort of micro-level local arrangement limited to a single school, or several schools located in a particular region. The schools are connected by a cable or microwave system. The telecast cannot be received outside the selected network and signal is not required to meet the commercial broadcasting regulations.

Closed Circuit Television (CCTV)

Televisions systems have assumed an important place in our daily life as they are one of the most indispensable means of information and communications. Television broadcasts are a form of 'open-circuit system', which are accessed by indefinite number of people. Another form of circuit systems are 'closed-circuit systems', which are designed to provide video to specified viewers. CCTV system is a system that has been primarily designed for surveillance purposes. CCTV is very useful in areas associated with security, disaster prevention, energy and manpower saving, sales promotion and information services, production management, industrial measurement, medical care, education and military fields. Specifically in the field of instruction and education, CCTV has a wide applicability. It enables schools or institutions to develop and allow their students to access specific programmes that are needed for their overall growth and development.

The definite advantages offered by CCTV have been highlighted as follows:

- Many CCTV systems are suited for distant viewing. The images broadcasted by them probably comprise photographs from space, snapshots of furnaces or other industrial equipment, and biological hazards.
- The use of CCTV would ease the shortage of good instructors or teachers, reduce instructional costs, provide uniform instructions to a large number of students simultaneously, and facilitate repetitive representation of resource persons or material.
- The use of CCTV provides a platform for desired exchange of man-material resources, learning and instructional activities, courses and events not only among students and staff of the same institution, but also among various institutions on the network of CCTV.

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Video cassette recorder

The video cassette recorder (VCR) is an electronic device that plays VHS or beta tapes containing recorded movies and other programmes (like music videos, exercise videos). A VCR has to be connected to a TV for viewing a recorded programme. A number of variants of VCR have been produced over the years, in addition to the traditional home VCR. These include combined 'all-in-one' devices such as the televideo (a TV and VCR in one unit) and DVD/VCR units and even TV/VCR/DVD all-in-one units. A camcorder merges a video camera and VCR in one machine.

VCR can not only play pre-recorded cassettes, but also record any programme and replay it. Thus, educational television programmes can be recorded and later on shown to students. With the help of video cassette recorders, educational and other useful events can be recorded for teaching purposes. The replay of those programmes in colour makes viewing very interesting and leaves a considerable impact on viewers.

Advantages of VCR

The advantages of VCR are as follows:

- The operation of a video cassette recorder is very simple.
- It is portable and can be moved from one place to the other easily.
- Knowledge acquired by video is permanent.
- It is helpful to students in providing them knowledge of social and political conditions of different countries.
- It is helpful in developing the thoughts and reasoning power of students.
- It is equally useful for children of varying abilities.
- The teacher can remove the doubts of students simultaneously, which is not possible in a television lesson.
- The teacher can control video presentation.
- Pictures on a VCR can be repeated as many times as required.
- Video films on different teaching subjects are easily available.

Motion picture

A motion picture (sometimes called a movie or film) is a series of still pictures (frames) usually 8 mm or 16 mm in size, taken in rapid succession. When projected by a motion picture projector, they give an illusion of motion Films vary in length from one minute or less, to 50 minutes or more. If a 6-mm motion picture runs for more than 50 minutes in length, it is usually stored on two or more reels. The speed at which a film is projected varies with the format of the film. A sound 16-mm film is projected at 24 frames per second (fps) and super 8-mm films, at 18 fps. Therefore, it is possible to show films in such a manner as to create three types of images:

(i) Normal motion

(ii) Fast motion

(iii) Slow motion

Motion pictures are very useful in teaching various subjects like literature, drama, history, geography and science subjects. They motivate students as they enjoy the

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medium. They bring people, country, events, etc., on the screen. However, they are expensive and subject to damage, if used extensively.

Hoban and Ormer have revealed the following educational advantages of motion pictures:

- Good films can be used as sole means of imparting certain factual information and developing performance skills.
- Pupils will change or develop attitude and opinions, as a result of viewing films.
- Pupils will learn more from films if they are properly prepared and motivated.
- Learning will increase with repeated screenings of a film. Short single-concept films have certain advantages.
- Pupils can develop the will of problem-solving by viewing well-produced films.
- The ability to learn from films will increase with practice.

Amid these advantages, it should not be assumed that learning would occur only by watching films. The method of presentation may be inadequate or the film may not be suitable for students of a particular age. Therefore, sufficient care should be taken while selecting a film. It should be borne in mind that films with built-in viewer participation and repetition of key points increase learning. If these factors are lacking in a film, then these should be supplied by the teacher during or immediately after screening of the film.

Tape recorder

A machine with built-in speakers and audio power amplification to drive them is usually called a tape recorder. If this machine does not have the record functionality, it is a tape player; while one that requires external amplification for playback is usually called a tape deck (regardless of whether it can record).

An audio tape recorder, tape deck, reel-to-reel tape deck, cassette deck or tape machine is an audio storage device that records and plays back sounds, including articulated voices. It usually uses magnetic tapes, either wound on a reel or in a cassette, for storage. In its current form, it records a fluctuating signal by moving the tape across a tape head that polarizes magnetic domains in the tape, in proportion to the audio signal. There are various types of tape recorders, from small hand-held devices to large multi-track machines.

The invention of tape recorder has brought about a revolution in the teaching–learning process. Its main function is recording and reproducing of sound. Microphone, amplifier and reproducer are its three parts. It is an instrument which is used to record speeches, songs, music, etc. It may be played back any time and any number of times. Teaching with tape recorder is an extension of a teacher's work.

The educational utility of tape recorder in education has been highlighted in the following points:

- There is no fixed time schedule for tape recorded programmes and thus, no changes are required in the school timetable. It can be used anytime and anywhere.

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- It helps in supplementing the educational output of radio and television broadcasts and guest lectures.
- Recorded educational programmes can be used for instruction in schools and colleges.
- It helps students in developing oratory skills by repeated practice. Further, it helps in overcoming poor speech habits and correcting speech defects.
- Tape recorders are immensely used in developing conversation skills, expression power and techniques of dramatization.
- They are significantly used in teaching specific subjects like music, dramatics and language.
- They are also used in organizations for conducting and evaluating various co-curricular activities.
- They may help in modification of behaviour and for encoding classroom events.
- They can supplement other educational tools like projectors and video players.

A tape recorder is very easy to operate and useful in group teaching as well as individual learning. It is also easy to erase a recording, if not required.

Computer

A computer is an electronic device that accepts data, performs operations on it in a sequence (decided by a programme) and gives the resulting output. Computers can be of various sizes and types like mainframe computers, mini-computers and microcomputers. Apart from size, computers are differentiated according to their specifications. These specifications include the amount and type of storage, capabilities of the central processing unit (CPU), and type and nature of the peripheral equipment (such as disc storage) that can be connected to it.

A computer has several applications in instructional situations. It is used to analyse the level of knowledge in entry level students, at the time of enrolment. It is also used to plan and print individual programmes, monitor a student's progress and compile tests and scores. Computers are aid to the instructional process of education. In terms of technological advancement and educational utility, they have surpassed all the audiovisual aid material and equipment. The demand for computers is increasing day-by-day, at all levels of education.

In various forms and at various levels, computer technology has been able to make a strong impact on education. The advantages of computers in education include efficient storage and rendition of information, quick information processing, and the most important benefit being saving paper.

Some of the characteristic features of application of computers in education are:

- Modern systems of education have been greatly influenced by the usage of computers. Students find it easier to refer to the Internet for searching information rather than look for it in books. The process of learning is not limited to learning from prescribed textbooks, it is much more.
- Computers have played an essential role in promoting education to a large number of learners. By taking education outside the classroom, this

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technology has made the dream of distance learning a reality. It has been able to bridge geographical barriers in the process of education. In other words, computer networking has brought physically distant locations closer. This has benefited all those in the field of education.

- Efficient storage and effective presentation of information has been enabled by use of computers. There are several presentation software like PowerPoint and animation software like Flash, which have proved to be of immense help to teachers while delivering information.
- Computers have the potential to add an element of fun to education. It is a good break from the monotony of 'chalk and talk' classes. They can turn out to be a brilliant aid in teaching, if used properly. Computers facilitate making the process of learning interactive and interesting by audiovisual presentation of information.
- Computers have helped in going 'green'. They help in saving paper by facilitating an electronic format for storage of information. There have been instances where schools have gone far and even collected homework and test assignments as soft copies and thus saved paper. It is well known that electronically erasable memory devices can be used repeatedly. They offer a robust storage of data and reliable data retrieval techniques. Computer technology, thus, eases the process of learning.
- The Internet can play a significant role in different aspects of education. Being a colossal information base, it can be used well for retrieval of information on a wide variety of subjects. There is no subject taught to students for which the Internet cannot be used to gather information.

Though computers have contributed in different spheres of education, the most important contribution is in the domain of instruction; in the form of computer assisted instruction (CAI) and computer managed instruction (CMI). Here, it needs to be emphasized that computers should be used as an educational tool, rather than a means of education. Nothing can replace interactions between students and teachers.

1.5.3 Still Projected Displays

Visual displays that are without movement are known as still projected displays. These displays rely on optical projectors. The visual aids involved in still projected displays are discussed in this section.

Overhead projector

An overhead projector (OHP) is a machine which projects light from a lamp through a transparent surface, onto a wall or a screen. The transparent surface (transparency) is the small sheet of plastic that has text or drawing on it. This writing or a drawing appears much enlarged and in exact form and shape, on a blank surface (wall). It helps a teacher to explain a point to the learner with the help of a visual.

Principle: Light is furnished by a 500 to 1,000 watts lamp, and is reflected upward to a projection stage or screen and into an objective lens, which is centrally supported above the stage. The light strikes a mirror and is reflected onto the screen

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behind the operator. The lens and mirror stand above the machine. The machine may rest on a desk or it may be on a projection stand, or table. Thus, the teacher may sit or stand in front of the class. The screen can be a flat, smooth, white/pale wall. A good and inexpensive screen can also be made from a hardboard. The rough side of the hardboard should be covered with two coats of white emulsion paint. This board may be hung in one corner of the room. The screen should not be reflective.

An overhead projector provides educators with an easy, low-cost interactive environment. Plastic sheets are used as teaching material, which facilitate the educator to write on them with the help of non-permanent and washable coloured board pens. These transparencies can be pre-printed and used in repetition. Thus, they save a lot of time for the teacher or any other user.

The overhead placement should be such that it is convenient for the instructor to use. Further, the educator should be able face the class, to facilitate better interaction with the students. Since the projector is able to enlarge small script, the educator can write in his own desired font size. He does not need to continuously stretch his arm to write on the board. Unlike a blackboard, time is not wasted in erasing what has been written. Once transparencies are used, they can be restored to their original unused state after washing them with soap and water.

Advantages of overhead projector

An overhead projector has the following advantages:

- When using OHP, a teacher can always face the class and thus, maintain eye contact with the students.
- Pre-prepared matter can also be displayed with the help of OHP.
- OHP transparencies can be used repeatedly, which gives the teacher more time to engage in discussions with learners.
- The subject displayed on OHPs also helps learners to retain the lesson learnt.
- Many techniques (free-hand writing or drawing, typing, photocopying, desktop publishing and so on) can be used to prepare OHP transparencies.
- In comparison to other types of visual aids (e.g., charts), overhead transparencies are relatively compact and can thus, be easily stored in suitable boxes, large envelopes, folders or files.
- All the lights of a room need not be switched off when using an OHP. This enables students to take notes.
- Small objects may be shown on the machine simply by placing them on the projection stage. They will be projected as silhouettes.
- No extra projectionist or person is required to project.
- The clarity of display in an OHP is higher than that on a blackboard.
- The instructor may prepare an entire course which is time saving.
- The operation of OHP does not require any technical skill and knowledge, making it is user-friendly. Moreover, it is also clean and quiet.

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Disadvantages of overhead projector

The disadvantages of overhead projector are as follows:

- OHPs run on electricity and require white surfaces for projection.
- When compared to chalkboards, their maintenance is somewhat time-consuming.
- They have a tendency to break down at times.
- Light from the projector can be irritating.
- Sometimes, positioning of the screen becomes difficult.
- Any error in spelling or pictures are magnified and distract the participants.
- Efficient usage of OHP requires sufficient time, effort and display material in the form of transparencies.

Basic instructions for using OHP

The following basic rules need to be followed for making optimum use of OHP:

(i) The appropriate positioning of the projector and the screen is of utmost importance. They should be placed in such a manner that every participant is able to see the screen easily. Generally, the screen should be placed in one of the front corners of the room, because that leaves the teacher with access to the fixed chalkboard or marker board, which he/she might need at anytime during the session.

(ii) The placement of the projector and screen should reduce or done away with two forms of keystoning. One form of keystoning emerges when the axis of projection is not horizontally perpendicular to the screen. This can be reduced when the projector is kept opposite to the centre of the screen. Another form of keystoning emerges when the axis of projection is not vertically perpendicular to the screen. Often, this can be lessened to a reasonable extent if the screen is tilted forward a bit. If the screen is fixed vertically, the problem can only be resolved by raising the level of the overhead projector. However, this should not block the learners' view of the screen.

(iii) The distance of the projector from the screen should be adjusted in such a manner that the entire screen covers the image proportionally, when in proper focus. If the focus is not proper, the people sitting far away from the projector will not be able to see the details on the screen clearly.

(iv) The surfaces of the lens should be clean and dust-free. Dusty surface of lens make the images opaque. It is recommended to use methylated or surgical spirit and soft cloth to clean the lens.

Slide projector

Slide projector or diascope is popularly known as 'magic lantern'. It is an optical aid to the process of teaching. It is used for projecting pictures from a transparent slide onto a wall or a screen. Since it is used to project slides, it is called a slide projector. A slide projector is useful for small as well as large groups. It comprises four sections: (i) electric incandescent light bulb or similar source of light (usually fan-cooled), (ii) reflector and 'condensing' lens to focus the light onto the slide, (iii) a holder for the slide, and (iv) a focusing lens. It helps to project a larger image of the slide. When the figure or illustration is very small and it is required that the whole class should see it clearly, a transparent slide of this small figure is prepared. The slide is placed inverted on the slide carrier of the magic lantern (slide projector). The slide projector projects its erect image on the wall or screen by enlarging its dimensions and making the vision sharper and clearer. A coloured slide or filmstrip is more attractive.

Filmstrip projector works on the principle of direct projection. Light rays emerge directly from the projection lamp or other source of illumination, pass through condenser lenses, the filmstrip/slide and the objective lens to produce an enlarged image on the screen. The source of light can be an electric bulb or a kerosene or petromax lantern. Images are directly projected as they are, when a filmstrip/slide is used. This allows them to be projected even if the room is semi-darkened, at a desired speed.

Advantages of slide projector

The advantages of slide projector are as follows:

- Educational information: The slide projector has immense educational value because of the variety of information it can transmit like maps, drawings, and diagrams, photographs. It enables a subject to be taught clearly and in detail. To make it more effective, a tape recorder can also be used along with the slide projector. The teacher can record a narration on a tape recorder and synchronize it with the slide projector such that it gives the necessary commentary pertaining to the slide without the teacher's intervention.
- Motivational force: It arouses the attention and interest of students. A projected image is more effective in capturing the attention of the audience for a longer duration. It is the best way to motivate students towards better learning.
- Easy to transport: Slide projectors are light and easy to transport.
- Easy to use: Slide projector is easy to use. It is a simple device that can be operated and focused using a remote control.
- Consistency of images: Images can remain on the screen as long as the students want them to.
- Interesting: The whole activity arouses interest in students.
- Economical: There is no wastage of time and energy.
- Inexpensive: Slide projectors are not costly. Any school can afford it.
- Non-fragile: It is not easily broken.
- Non-inflammable: It is non inflammable.

Disadvantages of slide projector

The disadvantages of slide projector are as follows:

- *Not always suitable:* Every type of material cannot be projected by the slide projector.
- *Not excessive use:* Since glass slides are becoming expensive now, the slide projectors may not be used excessively.

Filmstrips

Filmstrips may be used in slide projectors as well as filmstrip projectors. Instead of using different slide for different topics or more slides for one topic, one strip or piece of still film is prepared. Slides produced on films are called filmstrips. A filmstrip is made of cellulose acetate and is 16 mm or 35 mm wide and 2 to 5 feet long. It usually consists of 40 to 100 separate pictures related to a particular subject, topic or theme. These pictures may be connected with series of drawings, photographs, diagrams, or combination of these. Such a strip or a piece of still film serves the same purpose as served by a number of slides.

In a slide projector we use separate slides, while in a filmstrip a strip of film (having many slides) is exhibited. The filmstrip projector is a recent development and it is becoming a more popular means of pictorial representation. Various commercial firms sell such readymade filmstrips for different topics of different subjects for different age groups. Filmstrips are also available on loan, free of charge from the Central Film Library, Central Institute of Educational Technology, and NCERT.

Advantages of filmstrip

The advantages of filmstrip are as follows:

- It is easy to operate.
- A frame may be held on the screen as long as it is required.
- Strips of educative value, according to special needs, are available.
- It is possible to review previously exhibited frames again for reference.
- It can be used to transmit varieties of information.
- Now filmstrips are available with commentary recorded on tapes.
- The teacher can also record his comments and play the tape, synchronizing it with the frame of the filmstrip.
- Filmstrips are light in weight and easy to carry.
- Even a low voltage lamp can serve the purpose while using filmstrips.
- With every filmstrip projector, a 2 × 2 slide attachment is also provided and the same projector can also be used for projecting slides.
- Its use does not restrict the normal flow of conversation between the teacher and the class.
- Numbered filmstrips are advantageous for the learner, especially when one or two students use them in independent work. Numbering makes it possible to locate the frames.
- Since filmstrips present pictures in a fixed sequence, they provide a structure for the subject.
- Filmstrips provide economic means of presenting information.

Disadvantage of filmstrip

Filmstrips lack audition: The teacher has to work like a commentator along with the filmstrip being projected.

Epidiascope

An epidiascope projects small opaque images of, say, maps, photographs, and pages of a book. on a screen, in an enlarged format. It is a combination of an episcope and diascope. The epidiascope works by reflecting light from an opaque surface (opaque projection). A lamp illuminates the material. The image is reflected by a mirror, through a lens onto the screen.

It is used for making classroom teaching more interesting and effective. This device does not require slides. Teaching aids like maps, charts, small pictures, graphs, line drawing are directly projected on the screen. The size of small pictures can be magnified or enlarged by the epidiascope. In epidiascope slides, transparencies are also used. It also facilitates books and original matter or teaching aids to be directly projected on the screen. Therefore, the epidiascope is commonly used in classroom presentations. It also makes lesson interesting and effective.

Advantages of epidiascope

The epidiascope has general and specific advantages:

General

- Easy to handle.
- Projects a wide variety of materials in a magnified form.
- The colour of object is also transmitted onto the screen.
- Teachers can have time for class discussions.
- Often, an excellent outlet for creative work.
- It has a robust mechanism.

Specific

- Photographs and pictures can be projected (these are difficult to draw).
- Teaching material can be directly projected from books or other original sources.
- Small objects can be projected after demonstration.

Disadvantages of epidiascope

Some of the limitations associated with epidiascope are as follows:

- Pages must be flat when books are being used.
- Material sensitive to heat is to be avoided.
- Projection by reflected light is less efficient and requires total darkness.
- Machine is too bulky to be easily carried.
- The operator cannot face the audience.
- Projector must be kept near the screen.
- Expensive in terms of cost.

Precautions to be kept in mind while using epidiascope

- Before starting the class, the epidiascope and the screen should be set in the classroom.
- It requires a dark room for projecting teaching aids for which proper arrangements should be made.

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- The size of teaching aids should be according to the size of the epidiascope's aperture.
- The teacher should give his comments simultaneously while projecting the teaching material.
- The teacher should make use of a pointer for indicating the aspects of a diagram or picture.

Microfilm and Microfiche

Microfilms are 35-mm films, which contain photographed reading material. Each frame contains materials of one page. The rolls of microfilm are placed in microfilm readers which project each page on a revision screen. "Microfiche" is a miniature form of microfilm. This is a sheet of film carrying many rows of images of printed matter. Microfiche is reduced in size, in comparison to microfilm. Both microfilm and microfiche can be stored, retrieved, and projected for reading. They have great educational potential.

1.6 OBJECTIVES OF EDUCATIONAL TECHNOLOGY AT MICRO AND MACRO LEVEL

Micro-teaching is one of the most recent innovations in teacher education/training programme which aims at modifying teacher's behaviour according to the specified objectives. Recent researches in advanced countries in classroom teaching have proved that classroom teaching may be objectively analysed and modified, according to the requirements, to develop desirable teaching skills and competencies in the student teachers and even in in-service teachers. Micro teaching is one of the important innovations in this direction. It is a process of subjecting samples of human behaviour to 5 R's of video tape–recording, reviewing, responding, refining and redoing. Micro teaching is a controlled practice that makes it possible to concentrate on teaching behaviour in the student-teacher training programme.

Definition and meaning of micro teaching

Micro teaching has been defined in a number of ways. Some selected definitions are given here.

Allen, D.W. (1966): Micro teaching is a scaled down teaching encounter in class size and class time.

Allen, D.W. and Eve, A.W. (1968): Micro-teaching is defined as a system of controlled practice that makes it possible to concentrate on specified teaching behaviour and to practise teaching under controlled conditions.

Bush, K.J.V. (1968): Micro teaching is a teacher education technique which allows teachers to apply clearly defined teaching skills to carefully prepared lessorts in a planned series of five to ten minutes encounter with a small group of real students, often with an opportunity to observe the result on video tape.

Check Your Progress

8. Define hardware and software approaches.
9. Define technology of education.
10. Mention two advantages of VCR.
11. What are microfilms?

Clift, J.C. and others (1976): Micro teaching is a teacher training programme which reduces the teaching situation to a simpler and more controlled encounter achieved by limiting the practice teaching to a specific skill and reducing time and class size.

Encyclopedia of Education (Ed. Deighton, L.C:-1971): Micro-teaching is a real, constructed, scaled down teaching encounter which is used for teacher training, curriculum development and research.

Flanders, Ned. A. (1960): Micro teaching programme is organised to expose the trainees to an organised curriculum of miniature teaching encounters, moving from the less complex to the more complex.

Jangira, N.K. and Singh, Ajit (1982): Micro teaching is a scaled down teaching encounter or miniatured classroom teaching.

M.L. Alease, W.R. and Unwin D (1970): The term micro teaching is most often applied to the use of closed circuit television to give immediate feedback of a trainee teacher's performance in a simplified environment.

Passi, B.K. and Lalita, M.S. (1976): Micro teaching is a training technique which requires student teachers to teach a single concept using specified teaching skill to a small number of pupils in a short duration of time.

Singh, L.C. (1977): Micro teaching is a scaled down teaching encounter in which a teacher teaches a small unit to a group of five pupils for a small period of 5 to 20 minutes. Such a situation offers a helpful setting for an experienced or inexperienced teacher to acquire new teaching skills and to refine old ones.

Meaning of micro teaching. Micro teaching is a training procedure aimed at simplifying the complexities of the regular teaching process. In a microteaching procedure, the trainee is engaged in a scaled down teaching situation. It is scaled down in terms of class size, since the trainee is teaching a small group of four to six pupils. The lesson is scaled down in length of class time and is reduced to five or ten minutes. It is also scaled down in terms of teaching tasks.

These tasks may include practising and mastering of a specific teaching skill such as lecturing, questioning or leading a discussion; mastering of specific teaching strategies; flexibility; instructional decision-making; alternative uses of specific curricula, instructional materials and classroom management.

The short lesson is recorded on an audio or video-tape recorder and the trainee gets to hear and see himself immediately after the lesson. The pupils who attend the lesson are asked to fill in rating questionnaires evaluating specific aspects of the lesson. The trainee' own analysis of the lesson based on the authentic feedback from the tape together with the pupils' reaction and a supervisor's analysis and suggestions, assists the trainee in restructuring the lesson, which he then immediately reteaches to a new group of pupils. Further assessments by the learners and the supervisor lead to further improvements when he teaches again, either immediately after or several days later. This micro teaching sequence is practised usually in a micro-teaching laboratory in a teacher-training institution, or an inservice training programme in regular schools. (Fig. 1.4)

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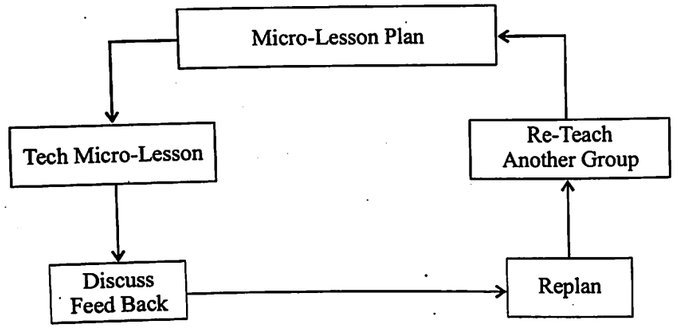


Fig. 1.4 Micro-teaching cycle.

Three volunteers from the participants play the teachers' roles in front of VTR camera and other participants also take part of pupils' roles. After discussing how the teaching behaviours should be improved, three volunteers teach other participants again. The comparison is made between two teaching traits in each teacher on the evaluation sheet. (see Fig. 1.5)

Main propositions of micro teaching. Allen and Ryan in their book on the subject give the following main propositions of micro teaching:

(1) Micro-teaching is real teaching, although a teaching situationis constructed in which the student-teacher and pupils worktogether in a practice situation. Bona fide teaching does take place.

(2) Micro teaching lessens the complexities'of normal classroom teaching. Class size, scope of content and time are all reduced.

(3) Micro teaching focusses on training for the accomplishment of specific tasks. These tasks may be the practice of instructional skills, the practice of techniques of teaching, the mastery of certain curricular materials, or the demonstration of teaching methods.

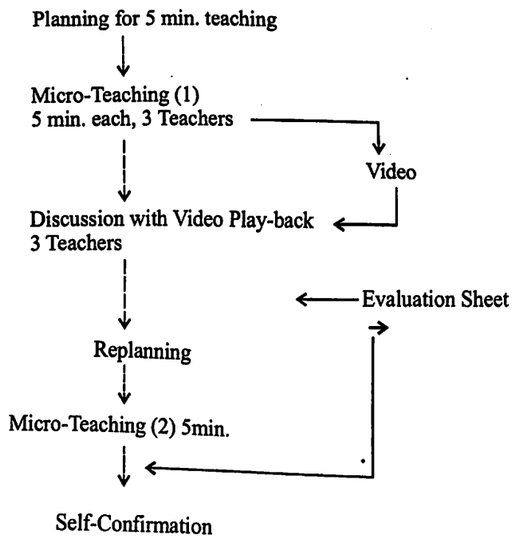


Fig. 1.5: Micro teaching flow chart.

(4) Micro teaching allows for the increased control of practice. In a micro teaching setting, the time, number of pupils, methods of feedback and supervision, may be manipulated.

(5) Micro teaching greatly expands the normal knowledge of results or feedback dimensions in teaching. Immediately after teaching a brief micro-lesson, the trainee is engaged in a critique of his performance. All this feedback can be immediately translated into practice when the trainee re-teaches shortly after the critique conference.

Two related areas can be pointed out where there are clear advantages: (i) training in teaching skill, (ii) research in teacher-training.

Phases, activities and components of micro teaching

According to J.C. Clift and others, micro-teaching procedure has three phases: (i) knowledge acquisition face (ii) skill acquisition face and (iii) transfer phase. (Fig. 1.6)

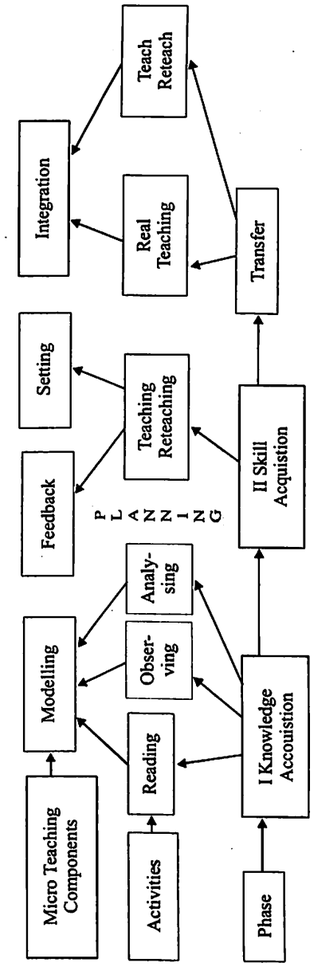


Fig. 1.6 Phases, Activites and Components of micro teaching

N.K. Jangira and Ajit Singh present these phases as under: (Fig.)

(*i*) **Knowledge acquisition phase:** In this phase, the student teacher attempts to acquire knowledge about the skill—its rational, it role in classroom and its component behaviours. For this he reads relevant literature. He also observes demonstration lesson— mode of presentation of the skill (modelling). The student teacher gets theoretical as well as practical knowledge of the skill.

(ii) **Skill acquisition phase:** On the basis of the model presented to the student teacher, he prepares a micro lesson and practises the skill and carries out the micro teaching cycle. There are two components of this phase: feedback and micro-teaching setting. Micro-teaching setting includes conditions like size of the micro-class, duration of the micro-lesson, supervisor, and types of students.

(iii) ***Transfer phase:*** Here the student-teacher integrates the different skills. In place of artificial situation, he teaches in the real classroom and tries to integrate all the skills.

Phases of micro teaching

Following are the three phases of micro-teaching as represented by J.C. Clift and others.

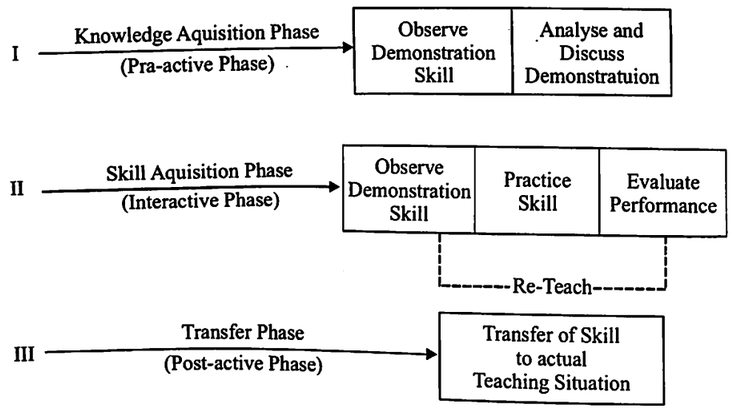


Fig. 1.7 Phases of micro teaching.

The three phases involve certain steps which are given as under:

1. ***Orientation of the student teachers:*** This involves providing necessary information and theoretical background about micro teaching on the following aspects:
   (i) Concept of micro teaching
   (ii) Rationale or significance of using micro-teaching
   (iii) Procedures of micro teaching
   (iv) Requirement and setting for the adoption of micro-teaching technique
2. ***Discussion of teaching skills:*** Under this step the knowledge and understanding of the following steps is to be developed:
   (a) Analysis of teaching into component teaching skills
   (b) Discussion of the rationale and role of these teaching skills in teaching
   (c) Discussion regarding the component teaching behaviours comprising various teaching skills

3. ***Selection of a particular skill:*** Each skill needs to be practised at a time. Student teachers should be given necessary background for the observation of a model of demonstration lesson on the selected particular skill.
4. ***Presentation of a model demonstration lesson—a particular skill:*** Demonstration lesson by the teacher educator before the student teachers on the use of a particular skill is given. This is also known as modelling. Demonstration can be given in a numberof ways:
   (i) By exhibiting a film on a video tape
   (ii) By providing written material such as handbooks, guides amd illustrations.
   (iii) By making the trainees listen on audio tape
   (iv) By arranging a demonstration from a live model i.e. a teacher educator or some expert
5. ***Observation of the model lesson:*** An observation schedule designed for the observation of the specific skill is distributed for the guidance of the student teachers to observe the lesson.
6. ***Criticism of the model lesson:*** A critical appraisal of the model lesson is made by the student teachers.
7. ***Preparation of the micro-lesson plan:*** For the preparationof the micro-lesson plan, on the skill demonstrated, help may be taken from sample lesson plans and from the teacher educator.
8. ***Creation of a micro-teaching setting:*** The Indian model of micro teaching developed by NCERT gives the following setting:
   (a) Number of pupils: 5-10
   (b) Type of pupils: Real pupils or preferably peers.
   (c) Type of supervisor. Teacher educators and peers.
   (d) Time duration of a micro lesson: 6 minutes
   (e) Time duration of a micro-teaching cycle: 36 minutes.

   This duration is divided as under:

   Teaching session: 6 mts. Feed-back session: 6 mts. Replan session: 12 mts.
9. ***Practice of the skill:*** (teaching session) Under this step, the student teacher teaches the prepared lesson for 6 minutes to a micro-class of 5-10 real pupils or peers (student teachers). This lesson is supervised by the teacher educator and other student teachers (peers). Where possible, the student teacher may also have the lesson taped on a video or audio tape.
10. ***Providing feedback:*** The peers and the teacher educators observing the micro lesson may provide immediate feedback.Where possible mechanical gadgets like the video-tape, audio-tape,closed circuit television may be used for getting feedback.
11. ***Replanning*** (re-plan session): In the light of the feedback, the student teacher replaces his micro lesson. He is given 12 minutes for this purpose.
12. ***Reteaching*** (re-teach session): This session lasts 6 minutes and the student-teacher re-teaches his micro-lesson on the basis of his replanned lesson.

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13. ***Providing re-feedback*** (re-feedback session): The student teacher is provided re-feedback on the re-taught micro-lesson.

14. ***Integration of teaching skills:*** This is the last step and is concerned with the task of integrating several skills individually mastered by the student teacher. It is helpful in bridging a gap between training in isolated teaching skills and the real teaching situation faced by a teacher.

Important features of micro teaching

1. ***The micro element:*** The micro element, which systematically attempts to simplify the complexities of the teaching process is the cardinal feature of micro-teaching. Underlying this is the basic supposition that before one attempts to understand, learn and perform effectively, the complicated task of teaching, one should first master the components of that task. By focussing the training on a specific task, and by reducing the complexities of the teaching situation by diminishing the number of students, the duration of the lesson and subject-matter to be covered, it is possible to concentrate on the training process and assure greater effectiveness.

2. ***Technical skills of teaching and teaching strategies:*** A repertoire of teaching skills such as lecturing, questioning or leading a discussion and mastery of teaching strategies is the second important feature of micro teaching. The concept of teaching skills is not new, and many text books on teaching methods refer to specific skills or teaching strategies. But never before has there been such a systematic approach to analysing classroom interaction for the purpose of research and training. For example, teaching skills can be classified under five general headings of response, questioning, increasing student participation, creating student involvement, and presentation, with three or four skills further delineated within each category. Detailed manuals and series of model films explaining and illustrating these skills have been prepared for training purposes.

3. ***The feedback element:*** The feedback element is the third important feature of micro-teaching. At present, feedback in the supervision of student teachers is ordinarily based on a supervisor's recall and selective note-taking. His over-all impressions providethe basis for subsequent analysis of the student teacher's performance. But subjective factors enter into his assessment (as they do into the student's ability to recall details of the lesson) and in the absence of objective criteria the student may covertly oppose the supervisor's evaluations and suggestions.

   (1) The most simple source is the oral feedback of the laboratorysupervisor. Experience has shown that the relatively non-threatening atmosphere in the laboratory creates better communication between the supervisor and the trainee, even if his feedback is subjective. The micro-elements of the laboratory help the supervisor in focussing and concentrating his observations, thus, ensuring greater accuracy of feedback.

   (2) Another source of feedback consists of questionnaires filled in by the pupils learning in the micro lesson. These questionnaires—geared to specific skills with well-defined questions—provide the most important, although subjective, feedback from the teacher's clients'. When teachers

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are used to the pupils' feedback and accept it with some ease, it is possible even to conduct short discussions with the pupils in which the teacher and his supervisor try to elaborate on the feedback provided by these questionnaires.

   (3) Audio tape-recordings are an important source of accurate feedback. Recent technological developments have resulted in small, portable tape recorders, operated by batteries and relatively low-priced. This calls for expanding their general use in schools and particularly in micro-teaching laboratories. They are, however, limited to verbal interaction in the class and, thus, do not provide the 'whole picture'. A supervisor's comment, based solely on an audio-tape might be considered by the teacher as one-sided. In addition, the peculiarity which causes many people not to recognize their own voice on tape, disturbs sometimes its acceptance as a source of feedback.

   (4) The most accurate and powerful source of feedback is the video tape-recording. Newly developed portable video tape- recorders consist of a small camera and a small television monitor. Classroom activities can be, thus, recorded with minimum disturbance to teacher and students. It provides instant and accurate feedback of classroom interaction (verbal and non- verbal) in the teacher's natural habitat and thus provides a basis for reliable analysis.

The effectiveness of video tape-recordings and playback techniques has been confirmed in a number of studies of teacher training and in related areas such as counsellor training and counselling, psychotherapy and human relations.

4. ***Safe practice grounds:*** Providing a safe practice ground is another important feature of micro teaching. A micro teaching laboratory seems to be one effective answer, for it appears to posses all the inherent features of the real classroom. The student teaches the relevant subject matter to genuine pupils (at whatever level isdesired).

5. ***The teaching 'models':*** The tapes or films of teaching models are an important facet to the learning process in the micro teaching laboratory, and provide the trainee with many opportunities to study desired patterns of teaching behaviour. There are, of course, many styles of good teaching and trainees will develop their own individual styles using these models as a guide.

6. ***The research laboratory:*** The micro-teaching laboratory simplifies the act of teaching and provides opportunities for controlled research to a degree never possible before. According to Allen and Ryan, the following areas of research seem to make the most effective use the micro teaching settings: (a) in-house stud-ies designed to optimize the procedures and sequences in the micro teaching situation; (b) research in modelling and supervisingtechniques; (c) task analysis of the teaching act and the investiga-tion of the relationships between teaching behaviours and student performances; (d) aptitude treatment interaction studies, to try to provide optimal training procedures for teachers with different abilities, interests and backgrounds.

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Important characteristics and features of micro teaching may be summarised as:

1. Micro teaching is relatively a new innovation in the field of teacher education.
2. It is a training technique and not a teaching technique.
3. It is scaled down teaching:
   (a) which reduces the class size 5 to 10 pupils.
   (b) which reduces the duration of period 5 to 10 minutes.
   (c) which reduces the size of the topic.
   (d) which reduces the teaching skill.
4. It provides adequate feedback..
5. Micro teaching provides opportunity to select one skill at a time and practise it through its scaled down encounter and then take others in a similar way.
6. Micro teaching is a highly individualised training technique.
7. Micro-teaching permits a high degree of control in practicing a particular skill.
8. Use of video tape and closed circuit television makes observation very objective.
9. Micro teaching is an analytic approach to training

Micro teaching

At a macro-level, sociologists work to identify how various social forces, such as politics, economics, culture, etc., creates variation in schools. In other words, what effects do other social institutions have on the educational system?

Macro teaching is when a teacher teaches a large group of people. This style is utilized in the large lecture halls often seen on college campuses. Although there is less one-on-one interaction with this teaching style, a larger amount of material is often covered because this teaching style does not utilize repetitive skill practice.

The objectives of educational technology at the macro level or broad level are as under:

1. To identify educational needs of the community.
2. To determine the aims of education.
3. To develop a suitable curriculum.
4. To determine appropriate strategies.
5. To identify the resources-human and non-human.
6. To locate the major obstacles in the way of proper development of learners.
7. To suggest remedies to overcome the above traced out obstacles.
8. To manage the whole system of education.

Check Your Progress

12. What does micro teaching mean?
13. What are the three phases of micro teaching?

1.7 SYSTEMS APPROACH

Systems analysis or approach is a term used to describe the systematic application of educational technology to an educational or training problem starting with the input (entry behaviour) and output (terminal behaviour) and determining how best to progress

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from the former to the latter. Systems approach is an educational tool developed to make the educational adventure more flexible, holistic, logical, orderly, responsible and self-correcting rather than intuitive, undefinable and unordered. What is unique about the systems approach is that it enables the analysis of not isolated components, but of the whole and helps one to think in a Gestalt way rather in a fragmented manner. Aristole's statement, 'the whole is more than the sum of its parts' indicates the basic nature of a system.

Definition of systems analysis

1. *The Advanced Learner's Dictionary of Current English* definesa system as "Group of things or parts working together in a regularrelation."
2. *A.K. Jalaluddin* (1981): "A system may be defined as adynamic, complex, integrated whole consisting of self-regulatingpattern of interrelated and interdependent elements organised toachieve the pre-determined and specified objectives."
3. A. *Angyal* in *Foundations for a Science of Personality* (1941)defined systems approach as a holistic organization, where parts ofthe system are arranged (organized and interrelated) in a way thatdistinguishes them from a simple collection of objects.
4. *Banghart* (1969) defines a system as "an integrated assemblyof interacting elements, designed to carry out co-operatively apredetermined function."!

All systems are made of parts called the sub-systems and are parts of the higher order system called the supra- system. *A* simple system is illustrated in Figure 1.8. In the figure, the system consists of four distinct elements or components, A, B, C and D, which are related to or dependent upon one another as indicated. Some inter-relationships may be two-way, while others may be one-way only.

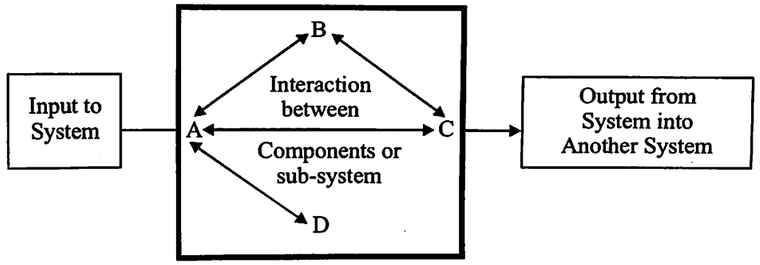


Fig. 1.8 Atypical system.

Systems approach in Education

Education is a dynamic system, its efficiency being determined by the inputs and the outputs. It is a dynamic organization of mutually related components in a meaningful pattern and any change in one component may affect the overall performance of the system, either beneficially or adversely.

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Systems approach as applied to education is a rational problem solving method of analysing the educational process taken as a whole, incorporating all of its parts and aspects, including the students and teachers, the curriculum content, the instructional materials, the instructional strategy, the physical environment and the evaluation of instructional objectives.

Vandana Mehra in an article gives the systems model of the process of education as given in Figure 1.9. As is evident from the figure, input to an educational system consists of people, resources and information and the output consists of people whose performance has improved in some desired way. The output is improved through increasing the efficiency of educational process for enabling optimum assimilation of knowledge and skills to occur during the educational process and hence, maximize the quality of the output.

Components of an instructional system are:

(i) Stating instructional objectives which helps system designer to decide what to teach

(ii) Pupils

(hi) Teachers

(iv) Content

(v) Determining optimum learning conditions to attain instructional objectives i.e. task analysis, keeping in mind the entry behaviour of learners.

(vi) Deciding upon the instructional strategy and media, and

(vii) Conducing evaluation (formative and summative and feed-back).

Figures 1.10, 1.11 and 1.12 explain various aspects of the instructional system.

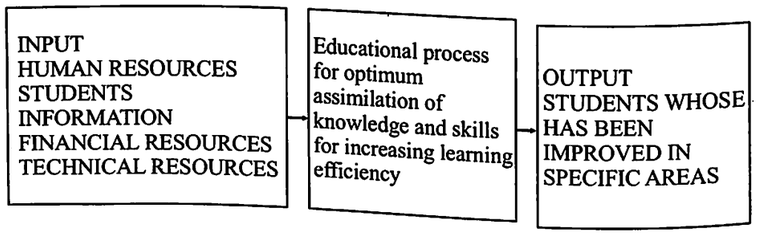


***Fig. 1.9** The 'system' model of the educational process.*

Processes involved in systents approach. Following processes are involved in the systems approach:

1. Identifying objectives
2. Designing learning experiences
3. Evaluating effectiveness in achieving the objectives
4. Improving learning experiences in the light of evaluation to better the objectives

Steps in systems approach

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I. Identifying objectives. This step includes:

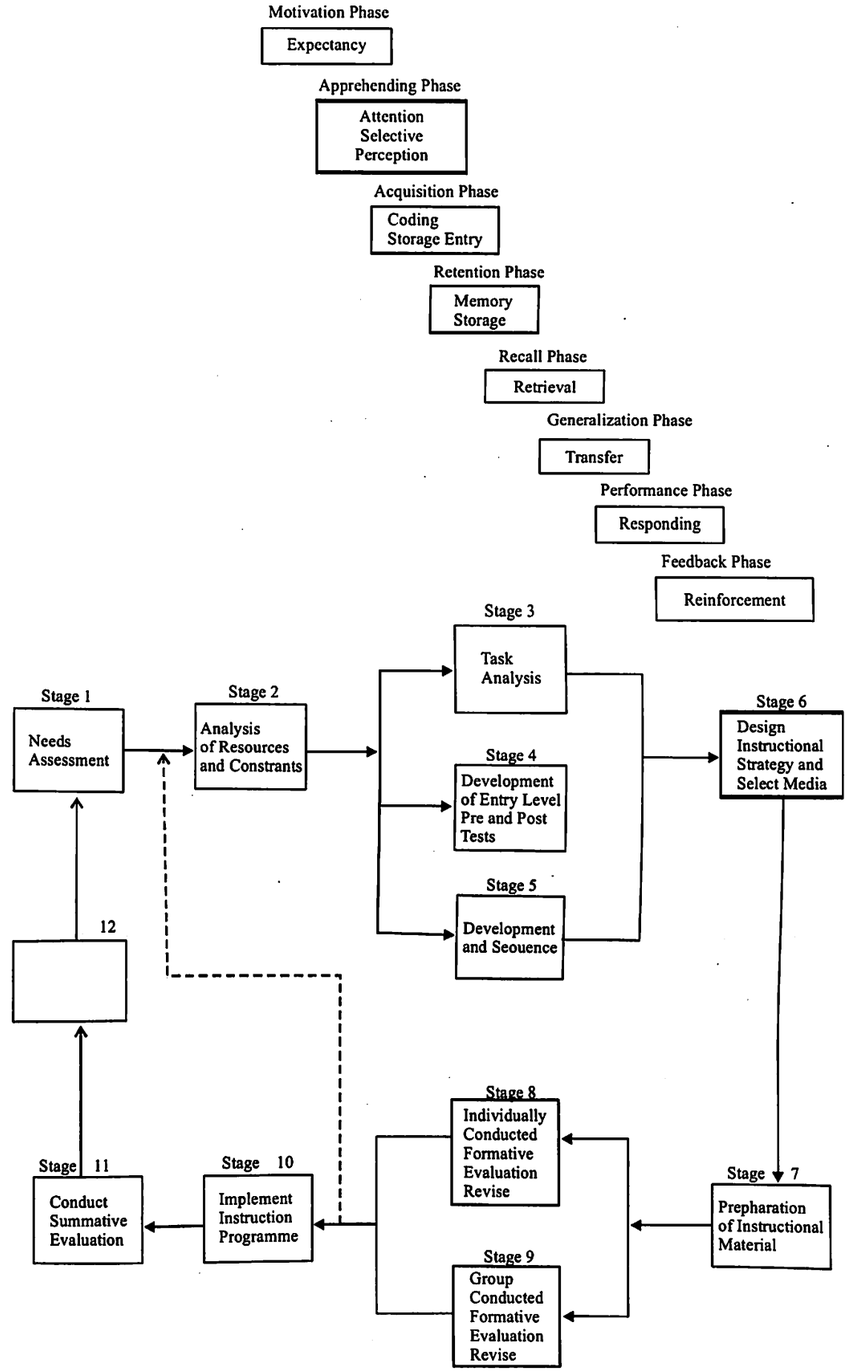


***Fig. 1.10** Model of the Instructional System.*

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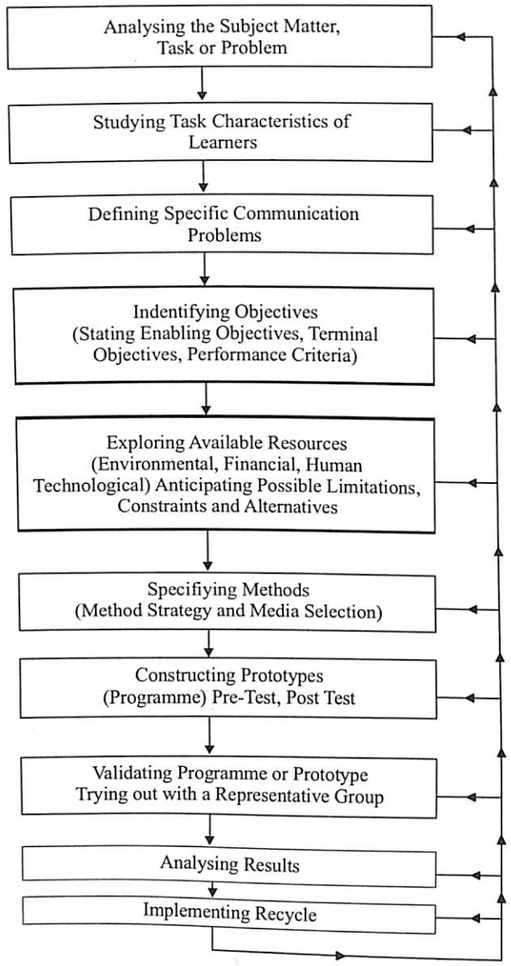


Fig. 1.11 *Flow chart Showing in Detail the path Followed at the Macro-Level—Instructional level in Designing a System.*

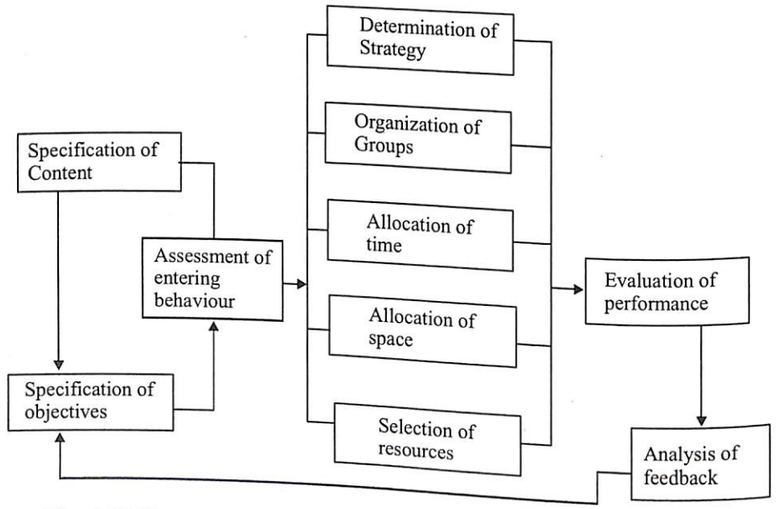


Fig. 1.12 *Systematic Approach to Instruction (as developed by Vernon S. Gerlach and Donald P. Ely in Teaching and Media: A systematic approach)*

1. Determining the broad aims of the course
2. Deciding as to what kind of people you are helping yourstudents to become
3. Finding out the range of backgrounds, interests, attitudes, aptitudes, skills and understandings of the students
4. Deciding learning experiences that the learners should process
5. Deciding about the test you will use as a criterion for evaluation when checking the extent to which objectives have been achieved
6. Deciding about the various techniques you would use, i.e., paper-pencil test, interviews, observation, and questionnaire

II. *Designing learning experiences.* This includes:

1. Visualising conditions necessary to achieve these objectives
2. Identifying learning sequences
3. Deciding teaching strategy for reaching the goal
4. Selection media of teaching-learning, i.e., lecturing, discussion, field trips, role playing, textbook, models, programmed learning, and multi-media.
5. Documenting experiences which include film also.

III. *Evaluating effectiveness in achieving the objectives.* This implies:

1. Engaging students in the learning experiences you have designed.
2. Applying criterion tests to determine how students have changed as a result.
3. Determining which objectives have been most widely attained,which remain unattained and by which set of students.
4. Determining whether any unplanned objectives have been attained.

IV. Improving learning experiences. This means:

1. Determining the strengths and weaknesses of the course
2. Identifying remedial weaknesses
3. Trying out the revised learning experiences and evaluating again
4. Updating the course
5. Restarting the course

Advantages of systems approach

1. Systems approach provides a framework on which the plans for implementing changes in education can be built.
2. It assists in identifying the suitability or otherwise of there source material to achieve the specific goal.

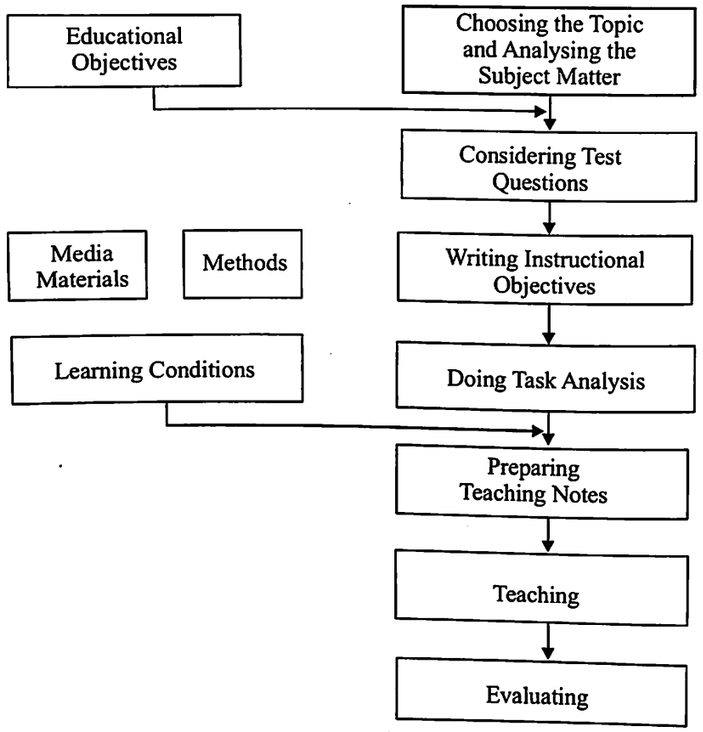


***Fig. 1.13** Flow Chart Showing in Detail the Path Followed by a Teacher in an Instructional System.*

3. It helps in assessing the resource needs, their sources and facilities in relation to quantities, time and other factors.
4. It assists in making use of technological advance to provide integration of machines, media and people for attaining the defined goals.
5. It permits an orderly introduction of components required to be demonstrated for systems' success in terms of student learning.
6. It avoids rigidity in plan of action as continuous evaluation affords desired changes to be made.

Role of the teacher in systems approach

As a matter of fact, best teachers have always done something of the sort of systems approach. It has, therefore, been stated by Michael Eraut and Geoffrey Squires that systems approach is a 'response different in degree rather than kind from the other good method.

A system-oriented teacher does the following:

1. Thoroughly assess the inputs of his system
2. Gathers as much data as possible about his subject-matter
3. Thinks of alternative processes for achieving his objectives
4. Analyses his objectives into well-defined learning tasks
5. Makes discussions regarding processes and components based on the best means of furthering the purposes.
6. Activates the system by putting the plan into action.
7. Gathers feedback data accordingly and systematically.
8. Modifies the system's components and processes based on the feedback
9. Assesses the effectiveness of the system by comparing the outputs with the inputs
10. Modifies the system based on all resources of feedback.

1.8 SUMMARY

In this unit, you have learnt that:

- Educational technology is a complex and integrated process, involving people, procedures, ideas, devices and organization, for analysing problems and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning, says Association for Educational Communication and Technology.
- This fivefold meaning of educational technology represents the primary and central concept of educational technology. Each of these types can stand alone and yet be integral to others.
- There are wide differences of opinion regarding the definition of educational technology among theorists and practitioners.
- Educational technology should not be confused with teaching or instruction or learning or engineering, but it should be taken as sum total of all such aspects which go a long way in shaping the personality of the learner in a meaningful context.
- Educational technology has three components — methods, materials and media. Manpower is an essential component of educational technology, which intertwines the web of methods, materials and media.
- The three commonly accepted types of educational technologies are: (i) teaching technology, (ii) behavioural technology and (iii) instructional technology.
- The use of technology in teaching makes this skill simpler, specific, functional and unprejudiced. This form of educational technology rests itself on the knowledge of philosophy, psychology and science, so as to achieve the desired learning objectives.
- Behavioural technology emphasizes that psychosomatic values be used in learning and teaching.
- The evolution of a technology occurs when scientific learning and communication are used in teaching.
- In narrow sense, educational technology means a little more than the use of sophisticated hardware in teaching, including overhead projectors, tape recorders, televised films, cassettes, videodiscs, gramophones, etc.
- The hardware approach is based on the application of principles of physical sciences and engineering to education and training.

Check Your Progress

14. Define systems approach.
15. Give at least two advantages of systems approach.

NOTES

- Technology of education deals with applying the resources of technological knowledge in an organized way, through which every individual has to pass, for acquiring and using knowledge.
- Technology of education also includes decisions about different aspects of education like determination of educational objectives to be achieved, the size of learning groups, learning sequence, teaching methods and selection of media.
- Television is an important aid to teachers, supervisors and educational planners. It has been utilized for informal and formal education and for distance and correspondence education.
- The video cassette recorder (VCR) is an electronic device that plays VHS or beta tapes containing recorded movies and other programmes (like music videos, exercise videos, etc.).
- Slide projector or diascope is popularly known as 'magic lantern'. It is an optical aid to the process of teaching. It is used for projecting pictures from a transparent slide onto a wall or a screen.
- Micro-teaching is one of the most recent innovations in teacher education/training programme which aims at modifying teacher's behaviour according to the specified objectives.
- Systems analysis or approach is a term used to describe the systematic application of educational technology to an educational or training problem starting with the input (entry behaviour) and output (terminal behaviour) and determining how best to progress from the former to the later.

1.9 KEY TERMS

- **Behavioural technology:** It is a form of educational technology which is utilized to study and bring modification in the behavior of all learning organisms.
- **Filmstrip:** A filmstrip is made of cellulose acetate and is 16 mm or 35 mm wide and 2 to 5 feet long.
- **Microfiche:** It is a miniature form of microfilm. This is a sheet of film carrying many rows of images of printed matter.
- **Systems approach:** It is an educational tool developed to make the educational adventure more flexible, holistic, logical, orderly, responsible and self-correcting rather than intuitive, undefinable and unordered.

1.10 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Education technology, according to Finn, is a process, an attitude, a way of thinking about certain classes of problems.
2. Kulkarni has defined educational technology as the application of the laws as well as recent discoveries of science and technology to the process of education.

NOTES

3. Objectives of educational technology as observed by Leith are (i) to modernize learning methods and techniques according to the changing world (ii) to make classroom teaching clear, effective, objective and scientific.
4. The different types of educational technology are teaching technology, behavioural technology and instructional technology.
5. Behavioural technology emphasizes on the psychosomatic values in learning and teaching.
6. According to S.S. Kulkarni, the scope of educational technology is: (i) to analyse teaching-learning, (ii) to evaluate the functions of the components of teaching-learning, and (iii) to interpret these components in such a way that effective results can be achieved.
7. The purpose of educational technology is also to promote the efficiency of education by improving the quality of teaching, of educational administration, and of educational research.
8. Hardware approach implies the use of mechanical materials and equipment in the domain of education, such as audiovisual aids like charts, models, filmstrips, slides, audio cassettes and sophisticated equipment and gadgets. The software approach or software technology is associated with modern principles and theory of teaching, models of teaching, theory of instruction, and theory of teacher–behaviour and principles of programmed learning.
9. Technology of education can be referred to as a purposeful utilization, in combination or separately, of objects, techniques, devices, events and relationships to increase the effectiveness of educational purpose. It deals with applying the resources of technological knowledge in an organized way, through which every individual has to pass, for acquiring and using knowledge.
10. VCR helps in developing thoughts and reasoning power of students, while it is equally useful for children of varying abilities.
11. Microfilms are 35-mm films, which contain photographed reading material. Each frame contains materials of one page. The rolls of microfilm are placed in microfilm readers which project each page on a revision screen.
12. Micro teaching is a training procedure aimed at simplifying the complexities of the regular teaching process.
13. The three phases of micro teaching are knowledge acquisition, skill acquisition and transfer.
14. Systems approach is an educational tool developed to make the educational adventure more flexible, holistic, logical, orderly, responsible and self-correcting rather than intuitive, undefinable and unordered.
15. The advantages of systems approach are (i) It provides a framework on which the plans for implementing changes in education can be built (ii) It assists in identifying the suitability or otherwise of the resource material to achieve the specific goal.

NOTES

1.11 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the essential characteristics of educational technology?
2. What are the features of instructional technology?
3. What are the significance of software and hardware in education?
4. Write a note on how radio can be used in education.
5. Briefly state the phases of micro teaching.
6. Briefly state the advantages of any two visual aids in still projected displays.

Long-Answer Questions

1. How have educationists defined educational technology? What in your opinion is the most appropriate definition? Give reasons.
2. Explain the various types of educational technology.
3. Discuss the significance of educational technology.
4. Discuss the effects in television in facilitating education.
5. Discuss the important features of micro teaching.
6. How can systems approach be applied in education? Give your views.
7. Discuss the objectives of educational technology at the micro and macro level.

1.12 FURTHER READING

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UNIT 2 TEACHING-LEARNING PROCESS

Structure

2.0 Introduction
2.1 Unit Objectives
2.2 Educational Objectives
  2.2.1 Cognitive Approach
  2.2.2 Affective Approach
  2.2.3 Psychomotor Approach
2.3 Nature of Teaching-Learning Process
  2.3.1 Teaching Learning: A Three-way Communication
2.4 Teaching Variables
  2.4.1 Structure of Teaching: Three Variables
2.5 Levels and Operations of Teaching-learning
2.6 Summary
2.7 Key Terms
2.8 Answers to 'Check Your Progress'
2.9 Questions and Exercises
2.10 Further Reading

2.0 INTRODUCTION

Today's rapidly changing and complex world has thrown new and varied challenges to the education system. While there is a general awareness of the necessity to change and develop the preparation of students for productive functioning, there is a consistent demand to simplify the complex system and address the multitude of problems. One way of doing so is adoption of updated technological devices; the others could be treating the learner at that level of understanding where the child is comfortable. This would include the teacher to be intuitive in understanding the behavior of the child. This would also mean that learning is meaningful and holds significance in context to the child's environment. Learning experiences should be diverse and there should be an atmosphere of support. Ernst von Glasersfeld believes that education has two main purposes: to empower learners to think for themselves, and to promote in the next generation ways of thinking and acting that are deemed important by the present generation (Glasersfeld, 1995).

The teaching-learning process involves a method of monitoring and judging the quality of learning or teaching based on objective, data and scientific criteria. It is the most powerful tool to bring about desired changes in the students. Learning domains, also referred to as categories of learning outcomes, are critical to consider the approach towards teaching. Bloom's Taxonomy divides educational objectives into three domain —cognitive, affective, and psychomotor.

In this unit, you will learn about these educational objectives, the nature and levels of teaching-learning process.

2.1 UNIT OBJECTIVES

After studying this unit, you will be able to:

- Discuss the meaning of education and evaluate its objectives
- Describe the cognitive, affective and psychomotor approach of learning
- Interpret the nature of teaching-learning process
- Explain the variables and phases of teaching
- Identify the levels and operations of teaching-learning

2.2 EDUCATIONAL OBJECTIVES

The word education has a very wide connotation. It is hard to define. There is no single objective which can cover the whole of life with its various manifestations. The two poles of our concern; the temporal and the world of spirit are widely apart. Philosophers and thinkers from Socrates (469-399 B.C.) to Dewey (1859-1952) in the West and Yajnavalkya (about 600 B.C.) to Gandhi (1869-1948) in the East have defined education in accordance with their philosophy of life with the result that there emerged divergent concepts and definitions of education. The concept of education is like a diamond which appears to be of a different colour when seen from a different angle.

Like the proverbial elephant and the blind men, everybody i.e. a biologist, a priest, a philosopher, a psychologist, a statesman, a teacher, a shopkeeper, a merchant, an artisan seems to have his own concept of education which is influenced by his own outlook on life and his past experiences in a limited field.

Education a tripolar process: Education is also regarded as a tripolar process involving the interaction of the personality of the educator on that of the educand in a social setting which affects the modification of the behaviour of the educand. The knowledge of the nature of the educand is at once very useful and essential. Similarly, the educator also must thoroughly understand himself — his assets and limitations and act accordingly in educating the educand. The social setting has to be presented by the educator to the educand in a simple and purified manner. It must be remembered that the unconscious influence of the environment is subtle and pervasive.

Education a deliberate process: The process of education is not only conscious but also deliberate. The educator is fully aware of the fact that his aim is to develop the personality of the child along definite lines through the modification of his behaviour.

Education a psychological and sociological process: According to the psychological aspect of the process, the educator must understand the nature, interests, capacities and limitations of the child. The sociological aspect implies that the educator must interpret the endowments of the child in a social setting.

Education a process of self-realisation: It curbs the animal instincts in man and shows him the way to realize his latent powers. It, thus, makes the potential actual. It makes explicit what is implicit in us. It is, therefore, development from within and not an accretion from without. It modifies the behaviour of the educated. Ross points out, 'Education, thus, consists in a modification of natural development which as a result of education, is other than it would have been without it.' Education emancipates us from our oddities and infirmities. It is a process of sublimation of instincts. Education, therefore, may be visualised as a process of self-realisation and emancipation.

The self-realisation aspect of education is well emphasized by Gandhi. To him, education is 'an all-round drawing of the best in the child and man — body, mind and spirit'. Education is a 'pouring out' and not a 'pouring in' process. The word 'V' means 'out of and *duco* means 'I lead'. In other words, education means leading out the inborn powers and potentialities and enabling the child to become what he is capable of becoming. The word 'self-realisation' implies development of individuality in the child. We do not want our educands as dumb-driven, credulous creatures. Nunn points it out by saying that 'the complete development of individuality is the essence of education'. It is through this that 'he (educand) can make an original contribution to human life according to his best capacity.' The emancipation aspect of education has also been put forth by Tagore. According to him, education aims at 'Enabling the mind to find out that ultimate truth which emancipates us from the bondage of oust and gives the wealth not of things but of inner light, not of power, but of love, making thus its own and giving expression to it.'

Etymological meaning of education. Etymologically, the term education has been supposed to be derived from some Latin words and the meanings of these words are given below:

Educatum means the act of teaching

Educere means to lead out or to draw out

Educare means to bring up or to raise or to nourish.

Educo means to lead forth or to extract out

Great educators as great psychologists

Plato (427 to 347 B.C), the Greek philosopher has discussed the various aspects of education in his book *Republic*. He believed that the knowledge of human nature was one of the essentials for a well equipped teacher. It was the function of education to provide nurture to the main elements of human nature.

Rousseau (1712-1778) pointed out the need of the application of psychological principles to education. 'I wish', says he, 'that some discreet person would give us a treatise on the art of observing children—the art which would be of immense value to us, but of which the fathers and school masters have not as yet learnt the very first rudiments.'

Pestalozzi (1746-1827) believed that to fulfil the aim of education as harmonious, natural and progressive development of the pupils, the teacher must have an insight into the working of the child's mind.

Herbart (1776-1841) emphasised that lesson must be connected with the salient ideas in the child's mind. For relating new ideas the teacher must pay attention to the interests of the child. He formulated the famous formal steps of teaching—Preparation, Presentation, Comparison, Generalisation and Application. Understanding of the interests of the child is a key-note in Herbart's philosophy.

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Herbert Spencer (1820-1903) stressed the importance of the application of psychology in his books *Principles of Psychology* (1855) and *Education* (1861). He is the author of the famous maxims of teaching—From Simple to Complex, from Known to Unknown, from Definite to Indefinite and from Concrete to Abstract.

Dewey (1856-1952) in his book *Pedagogic Creed* wrote, "Education must begin with a psychological insight into the child's capacities, interests, and habits. . . These powers, interests, and habits must be continually interpreted, we must know what they mean. They must be translated into terms of their social equivalents—into terms of what they are capable of in the way of social service."

Montessori (1870-1952), the originator of the Montessori Method of Teaching felt that with a deep psychological insight, the teacher would easily understand when he is to step in to guide the pupil's behaviour in order to make steady progress.

Gandhiji (1869-1948), was not only a great leader but also a great educational philosopher. His basic system of education reflected psychological thinking when he said, "I hold that true education of the intellect can only come through a proper exercise and training of the bodily organs, e.g., hands, feet, eyes, ears, nose, etc. In other words, an intelligent use of the organs in a child provides the best and quickest way of development of his intellect. But unless the development of the mind goes hand in hand with a corresponding awakening of the soul, the former alone would prove to be a poor lopsided affair." He further observes, "In my scheme of things the hand will handle tools before it draws or traces the writing. The eyes will read the pictures of letters and words as they will know other things in life, the ears will catch the names of the things and sentences. The whole training will be natural, responsive and, therefore, the quickest and the cheapest in the land."

The above explanation makes it clear the close relation between psychology and education. Psychology deals with the nature of the child. Psychology provides an insight to the educator about the nature of the child. The educator adopts appropriate techniques to unfold the nature of the child.

2.2.1 Cognitive Approach

Cognitive or mental development implies the progressive changes in the mental process which go on from birth to death. Mental process is an activity on the part of the organism which is of a psychological nature or involved in the mind. There are mental tests to evaluate a specific ability or performance. Mental development includes various aspects such as development of concepts, perception, language, memory, reasoning, thinking, imagination and intelligence. Jean Piaget wat the first to develop the theory of cognitive development.Various dimensions of mental development are interrelated. The mental development of the child includes the overall development of various abilities.

Mental development is sometimes described as adding to the stock of information and knowledge. But if it is not accompanied by understanding and wisdom, such knowledge is barren.

Mental development or intellectual development is the development of the mental abilities and capacities which help an individual to adjust his behaviour to the ever changing environmental conditions or to enable him to accomplish a task that needs complex cognitive abilities. According to J.S. Bruner (1964), 'Intellectual development is the capacity to deal with several choices at the same time.'

NOTES

Various aspects of mental development

1. **Intelligence and mental development:** Mental development implies increase in intelligence. The results of intelligence tests show that mental or intellectual growth is rapid in infancy, moderate in childhood and slow in youth.
2. **Sensation and perception:** Both sensation and perception are considered important aspects of mental development. Senses are the elementary impressions gathered by sense organs. Impressions take the form of perception when they are interpreted and some definite meanings are attached to them.

   Through experience, a child's sensations become perceptions and he is able to give meaning to it. Child's sensory equipment becomes mature at the age of five. He shows great interest in seeing, hearing, touching, smelling and tasting. However, the child's sensations do not automatically assume meaning. During early childhood, the child is more likely to misrepresent things and objects because of lack of experience. For example, when viewed from a distance, a train may appear to a child as a toy train. But gradually the child's perceptions become more and more accurate through right kinds of experiences. By the time a child enters the school, she/he has gains enough experience. Yet the needs assistance and guidance to improve the ability to perceive by having first hand experiences and observations of objects, persons and situations around. Gradually the child develops a proper perception of space, time, form, movement and distance.

   Perception patterns become more organised and refined when an individual passes through the years to adolescence. Now they tend to become more definite, detailed and rich. Now they need not be associated necessarily with objects. They are beginning to be influenced by beliefs, ideals, opinions, etc.
3. **Concept formation:** Another important aspect of the child's mental development is the acquisition of concept. A concept is the generalised meaning that is attached to an object or idea. It is the result of one'sperceptual experiences. It involves both discrimination and generalisation.

   Discrimination begins sometimes after the child tries to generalise his perceptual experiences. Thus, he begins to acquire concepts. Experience is an important factor in concept formation. In early childhood, a child tries to develop various concepts from the concrete experiences in the form of actual objects.

   Normally, concept formation proceeds from concrete to abstract, from vague to clear and from inexact to exact, depending on the type of experiences a child receives. The child has a very poor concept of time. As stated by Crow and Crow, 'Time as such means little to the young child. He cannot distinguish among today, tomorrow, and next week except as they represent words rather than actual duration of time.'

   In later years, various experiences provided by reading, lecturing and motives help in concept formation.

Generally, concepts may be broadened and developed. They may even take a new shape. Wrong concepts can be altogether abandoned.

Gradually as a result of learning and maturation, the child's concepts become clear, definite and specific.

4. **Development of language:** The development of language contributes to the mental growth and development of the child. Important aspects of language development are speech, vocabulary and length of responses.
5. **Development of memory:** Memory is also an important element of mental development. There is little memory at birth but it gradually increases with maturation and experience. This has been explained by Hurlock and Schwartz in these words, 'Memory of an impressionistic kind appears in the first half of the year and instances of the true remembrance appear by the end of first year. During the first year memory is only aroused by sensory stimuli. With the learning of speech the child is able to remember ideationally by the end of the second year. During the first and second years the memory is stronger for persons and objects than for situation. In pre-childhood from three to six years, situations become significant factors in the child memory. Also the emotional quality of the impressions influence memory. By three years the child can recount the story heard a few days ago and he can also give information about past experiences.'

   A child has a good memory in the earlier stages but this memory is generally a rote memory. Memorisation is without reasoning and the child seldom uses logic and insight in memorisation. A child can cram and reproduce the matter easily. The memory tends to function more logically during later childhood and adolescence. A selection process of remembering and forgetting begins to operate. After that memory tends to decrease.

   Memory depends upon person to person. It is generally affected by health and situation of the child. The stimuli which are associated with a kind of memory influence significantly, its remembrance or forgetting.
6. **Creativity:** It may be stressed that creativity is the most singleability which is at the root of human progress. Like many other activities, it can be developed at a young age. In a general sense, creativity is the ability to think in novel ways which result in some new and original solution.
7. **Problem solving:** All thinking and reasoning involve meeting difficulties, facing complex situations and finding out solutions. An individual is beset with all these since childhood. Thinking and reasoning powers are used in problem solving and these begin to grow as early as two and a hal for three years of age Gradually the ability to reason grows.

Stages of mental development

Various stages of mental development are given below

1. **Period of infancy, beginning of awareness:** In the beginning mental activity consists of awareness of oneself. Later on, this awareness extends to the environments. The nervous system begins to grow during the prenatal period.

As the nervous system keeps growing before and after the birth, the process of mental development also goes on accordingly.

2. **Mental development before three years of Age:** During these years, the process of mental development is much faster. Important characteristics of this stage are (i) curiosity (ii) rote memory (iii) creativity (iv) time concept not yet developed (v) very little development of powers of observation, perception and concentration.
3. **Period of pre-school age:** During the age of two half or three to six, the mental abilities of the child develop rapidly. His perceptual powers increase and his curiosity is aroused to a great extent.
4. **Childhood and before adolescence:** During this period, the sensory powers increase rapidly and the child becomes more accurate in his observations. From a make-believe type of imagination, the child now starts thinking on creative lines. During this period, the likes and dislikes, interests, thoughts and plans of the child begin to shape themselves. The child begins to imagine things. The power of deductive and inductive reasoning increases and the child is able to generalise from a data given. The child develops the concepts of length, time and distance and teams to express herself himself in various ways.
5. **Mental development during adolescence:** Discussed in detail separately.
6. **Mental development during early adulthood:** The most important mental abilities needed for learning and adjustment to new situations, such as recall, reasoning and creative thinking reach their peak during the twenties and men begin a slow and gradual decline.
7. **Mental development and middle ages:** Studies conducted by L.M Terman and M.H Oden (1959) on a group of individuals followed from pre-school years to middle life have shown that mental decline does not set in during middle ages among those with high intellectual abilities.
8. **Mental development during old age:** Old people take more time to integrate their responses. They tend to lack the capacity for or interest in creative thinking. Old people tend to have poor recent memories but better remote memories. There is slight deterioration in vocabulary. The mental rigidity that sometimes sets in during middle age often becomes more pronounced as the person grows older

Cessation of mental growth: Psychologists have tried to give various ages ranging from thirteen to the early twenties or even much later as the age alter which there is no further mental growth. Sorcnson (I948) has tried to arrive at some conclusion regarding the age of cessation of mental growth. He writes, it is probably safe to conclude that a person reaches the maximum mental level at about the age of twenty or perhaps a little before or a little after twenty. It is true that on the average there is only a little mental growth during the late teens—nevertheless, this small amount may be very important.'

It may be remembered that all the changes in mental development do not occur all of a sudden or they strictly conform to a specific stage. The changes that are mentioned here are no doubt, signs of increasing maturity but no distinct stages in

mental development are noticeable. An individual or the child does not pass from the stage immediate and concrete to the stage of the remote or the abstract, at a particular level of his development. The process of maturity continues throughout all stages of development. At the same time it must be kept in view that there are certain behaviour patterns and certain development trends which are absent at one stage but are visible in the next stage or still in another higher stage.

Factors affecting intellectual development

1. **Heredity:** Intellectual development of an individual is greatly affected by the interaction between inherited intelligence and the individual's experience.
2. **Physical growth:** There is a strong relation between physical growth and intellectual development. A healthy person is likely to have a better intelligence than a person who has a poor physique.
3. **Physical environment:** Physical environment like fresh air, sufficient light and ample space has a great bearing on intellectual development.
4. **Family environment:** The kind of discussions held in the family, type of reading material like books and magazines read by the family affect the intellectual development.
5. **Socio-economic status of the family:** Parents of high socio-economic group have better access to send their children to good schools.
6. **School environment.** The methods of teaching, availability of good reading material in the library, attitudes of teachers and school discipline, etc. affect intellectual development.

It is concluded that intellectual development is the result of a large number of factors and is not an automatic process. It is a gradual and pain-staking process.

Mental development and educational implications

Mental development is influenced by both heredity and environment. Very little can be done to change the influence of heredity. But a good deal of work in this regard can be done by the parents, the teachers and the school to provide a healthy and motivating intellectual environment for the child. The cultural and social experiences, learning opportunities and discipline which he gets for the development process, contribute significantly towards his mental development. The child should be exposed to opportunities of narrating, observing, imagining, thinking, reasoning, questioning, doing independent work, manipulating and improvising. Among the important activities for the mental development are: (*i*) story making, telling, writing and listening, *(ii)* picture compositions, *(iii)* essay writing involving imagination, (*iv*) assembling of parts of some dismantled objects, (*v*) modelling, *(vi)* arranging colour cubes to form new designs, *(vii)* quiz competitions, (*viii*) debates and elocution contests and *(ix)* problem solving.

Jean Piaget's theory of cognitive development (mental or intellectual development)

Jean Piaget (1896-1980) is regarded as one of the pioneers in psychological investigation of children although he neither undertook formal study nor passed any

examination in psychology. He was a biologist by training. At an early age of 22, he obtained his doctorate degree in Zoology on Mollusks of Valias. He worked on child development for more than 50 years and produced enormous literature on developmental psychology. He read philosophy, psychology and sociology. He pursued clinical research at the Alfred Binet Laboratory at Paris. By observing, dissecting and experimenting with children, he developed his educational theory regarding cognitive development or learning by children. His work as a professor of child psychology at the University of Geneva (Switzerland) made him famous.

Piaget began his study of child development with the observation of his own three children. From this beginning, his investigations were gradually extended to other children. These investigations resulted in the publication of a large number of papers and books which are often quoted by eminent psychologists and other thinkers on education.

Before we describe Piaget's four stages of development we shall consider his views on education and learning and on some of the important concepts stated by him.

Piaget stressed the following aims of education:

1. The principal goal of education is to create men who arc capable of doing new things, not simply repeating what other generations have done. Education should create men who are creators, inventors and discoverers.
2. The second aim of education is to form minds which can be critical, can verify and do not accept every tiling they are offered.

Writing in his book, *To Understand is to Invent - The Future oj Education,* for the International Commission on the Development of Education, UNESCO, Piaget stated, 'The author of these lines is by no means a professional educator, but rather a psychologist led by his research to study the problems of the formation of man.' In other words, education in its real sense deals only with the formation of man and nothing else.

He revolutionised thinking and understanding about the intellectual growth of young children. According to his theory, a child goes through a scries of developmental stages which are as follows:

1. Sensori-motor stage (birth to two years)
2. Preconceptual stage (two to four years)
3. Intuitive stage (four to seven years)
4. Concrete operation stage (seven to eleven years)
5. Former operations stage (eleven to adolescence)

Piaget introduced four concepts in the building of his theory. These are as under:

(i) Schemes
(ii) Assimilation
(iii) Accommodation
(iv) Equilibration

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Schemes (cognitive structures): Piaget called 'schemes' as cognitive structures or the patterns of behaviour that children and adults use in dealing with objects in their environment. These patterns can be simple as well as complex. As the development proceeds, each pattern enlarges and changes. It is coordinated with other patterns to form more complex patterns. The infant sucks the breast of the mother, looks at the objects of the environment, listens to different voices in his environment and finally tries to comprehend, conceptualise the articles, animals, space and many other behaviour patterns or structures.

Assimilation: Assimilation implies incorporation of something from the environment. New ideas, concepts and stimuli are taken in and incorporated into one's 'existing set of scheme.' A scheme is the organised pattern of behaviour which the child develops when engaged in any activity. For example, when a child is engaged in sucking, there is a certain pattern of movements of the cheeks, lips and hands. When a child is confronted with a new object, child will try to understand the new object by applying the old scheme to it. The child grasps, adapts herself/himself to a new object by assimilating it. The child's old scheme does not change in the process.

Accommodation: Accommodation involves modification or change of some elements of an old scheme or learning a new scheme which is more appropriate for the new object. A baby who has already got a scheme of sucking mother's breast accommodates to the object placed in the mouth — finger, pencil, a toy—depending on its shape, form and the size. The baby develops a new scheme or a modified scheme. This is called accommodation.

Thus, a baby assimilates when he understands and perceives the new in the light of his old perceptions. A baby forms a new scheme 'modifies or changes the old perception to suit the new. This implies adjusting or accommodating. In this way a baby forms new structures or new schemes, and consequently develops cognivity.

Equilibration: The structures or the schemes change from one stage to another by the process of equilibration—maintaining balance between the child and the changing environment. According to Piaget, when by the existing scheme, the new situation is not fully handled, then there is created a state of disequilibrium or an imbalance between what is understood and what is encountered. In such a case, the individual tries to reduce such imbalances. This is done by him by focussing his attention on the stimuli that has caused the disequilibrium and developing new schemes or adapting old ones until equilibrium is restored. This process of restoring balance is called equilibration. Piaget believes that learning depends on this process

Stages of child development

Piaget divides the stages of cognitive development of the child into the following categories:

1. **Sensori-motor stage:** This stage covers the period from birth to two years. This stage is marked by sensation. Simple learning occurs but the child does not think at this stage. These early sensori motor experiences of the child have a great bearing on the development of his later intellectual abilities. In the world of the child an object exists when it is physically present. He then gains some consciousness about the stability of the object. He starts comprehending casually.

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It is sometimes said that the child's mental development at this stage is equal to that of an intelligent animal. By the end of two years, the child develops the concept which is characterised by relationship among objects and between objects and his own body.

2. **Preconceptual stage:** This stage is roughly between two years and six years. The child develops ways of representing events and objects through symbols, including verbal symbols of language. He can now think about things that are not immediately present.

   The child now becomes ego-centric i.e. primarily concerned himself.

3. **Intuitive stage:** This covers the age four to eight years. The reason of the child is not logical and is based on intuition rather than systematic logic. The intuitive thought is primarily concerned with static conditions but the child is able to use concepts as stable generalization of his past and present experiences. He, however, cannot adequately link a whole set of successive conditions into an integrated totality.

4. **Concrete operations stage:** The stage of development is usually between the age of six and eleven or twelve years. At this stage a child is concerned with the integration and stability of his cognitive system. The child develops logical operations from simple associations. He learns to add, substract, multiply and divide. He is in a position to classify, concrete objects. These operations are called concrete because they relate directly to objects. These operations do not involve abstract thinking. Piaget has coined a new term grouping to describe a set of operations. Piaget has given a long list of operations which make it possible to handle numbers in various relations to each other, the arrangement of objects into classes and sub-classes and the ordering of objects according to one or more attributes.

5. **Formal operations stage:** This stage is roughly from twelve years to adolescence. At this stage the thought process of the child becomes quite systematic and reasonably well integrated. The child is in a position to free himself from the concrete operations related directly to objects and to groups. He is capable of reasoning with propositions removed from the concrete. He develops an experimental spirit. Now he solves problems more systematically and the bases of action are not trial and error. The youngsters at this stage are able to organize information, reason scientifically, build hypotheses based on understanding to causality and test their hypotiiesis.

Piaget's views on various aspects of learning

1. **Meaning of learning:** Learning includes the wide range of activities. Rigid distinctions like classroom for instruction, laboratory for practicals, recess for amusement, mathematics for developing computational ability, and athletics for strengthening the body muscles, are unnecessary. Piaget's approach helps to tie together what have been treated as separate subjects.

2. **Role of learner's actions:** Action stresses the role of active exploration. A child is active when he stares at objects. A child is active when he stares at an organism. A child is active when he studies his body parts. A child is active when he lifts something. A child is active when he carries things. A child is active when he

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arranges things. Children are usually active for most of their time. There is no doubt that some of these activities may be rather aimless or unnecessary. However, most of these activities are purposeful.

3. **Role of practice:** An important part of Piagetian model is repetition of an act by a child. The role of practice varies the development. Concepts are the products of a long history of action. A child may take three or more days to complete a puzzle. Each day he appears to go through the same sequence. Child's actions upon the environment are repeated again and again with slight modifications each time. Piaget depicts the child as somewhat slower and methodical and systematic in acquisition of new ideas.
4. **Motivation:** According to Piaget, a learner desires to reduce his internal conflicts by keeping his thoughts harmonious and in equilibrium. It is only through playing, imitating, exploring and questioning that a child gradually comes to distinguish the achievable from non-achievable, and logical from the illogical. To Piaget, the progress towards this end is inherent, a property of cognitive style as are eating, drinking and breathing in the physiological field.
5. **Memory:** Memory is a symbolic representation of how the child has schematised what he saw. Experiments conducted by Piaget reveal that after six months, 61 per cent of the children from 4-8 years of age regressed in their memory ability if tested by recall or evocation.

   A reconstruction test involving the child with some material showed regression in 4-5 years old but 48 per cent progression among 6-7 years old. Piaget holds that recognition is perceptual and reconstruction is internalized imitation. Each experiment reveals that the pattern of accuracy, improvement and regression (gradual loss of memory) is determined by initial conceptual understanding and is altered by new understandings.
6. **Interest:** According to Piaget, the interest of the child at any given movement depends upon the system of ideas he has acquired plus his affective perception. A child tends to fulfil his interests in the direction of greaterequilibrium. Equilibrium according to Piaget is development and the abilityto think in a logical and natural manner.

General educational implications of Piaget's cognitive theory of development

1. It provides a broad development perspective to the educator for building a curriculum for the children.
2. The description of developmental stages and qualitative aspects of intellectual growth is very useful in providing suitable educational practices.
3. The cognitive theory states that the child is to be actively involved in the teaching-learning process for his intellectual growth.
4. Piaget-based curriculum requires that children should not skip any stage
5. The pre-school child is at the pre-operational level. The educational programme at this stage should provide concrete operations.
6. Educational programme should enable the child to integrate the information.
7. A child should be helped to develop internal consistency of the system.

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8. Most of the activities of the Piaget type require simple equipment and material.
9. Drilling in skills is to be avoided
10. Teaching learning situation should be geared to a point where the child is neither too familiar nor too unfamiliar with the objects and ideas
11. Variety of cognitive activities like story telling, rhymes, and singing are included in the programme in a systematic manner. There is a deliberate attention of developing cognitive growth.
12. A child's development is retarded if he is not allowed a fairly wide sensory and motor experience in his early years.
13. Real events and concrete objects play an important role in learning.
14. In science and mathematics, learning from physical environment is more important than what is learnt from people, books or television.
15. A teacher should arouse curiosity of the child through planned activities.
16. Children like to find out by themselves by their own spontaneous activity.
17. Children learn speedily if we provide concrete material to them.

Educational implications at the pre-school and primary stage

1. The teacher should familiarise himself with the theoretical and practical aspects of Piaget's theory of cognitive development.
2. The teacher should try to assess the level and type of thinking of each child in his class.
3. Each child may be asked to preform some of the experiments as suggested by Piaget.
4. The teacher should spend a lot of time in listening to each the child's reaction to the experiments.
5. Plenty of equipment materials and opportunities should be given to children to learn on their own.
6. For social interaction, group situations may be arranged so that children learn from each other.
7. Learning experiences should be so arranged as they take into account the level of thinking of mental development attained by an individual or group.
8. It should be kept in mind by the teachers that the children may be influenced by egocentric speech or thought.

Secondary classes

1. The teacher should familiarise herself with the nature of concrete operational thinking and formal thought so that she is able to note when the students are applying either of the two or a combination of them.
2. Students may be asked to conduct a few experiments suggested by Piaget.
3. Each student may be asked individually to explain how they would arrive at solutions to problems in response to the experiments similar to those devised by Piaget.

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4. Students should be guided to be more systematic regarding solving problems.
5. Care should be exercised to ensure that class discussions are constructive and do not go astray.
6. Students should be trained to appreciate the viewpoints of others. They should not become egocentric.

Criticism of Piaget's Theory of Development

Several psychologists do not agree with Piaget's theory of cognitive development. According to R.M. Gagne (1968), stages described by Piaget are not necessarily the inevitable result of a inborn time-table. Instead they are a consequence of children having learned sets of rules that are progressively more complex and these rules are taught by their physical and social environment. Gagne thinks that Piaget was indifferent to the role of learning in developmental changes.

Some psychologists do not agree with the view of Piaget that infants are born with some elementary mental structures that are starting points for their attempts to deal with their environment.

Piaget's views are not new to educational thought. What is new is that they have been stated in the context of the classroom situations. Instruction in the classroom would serve the function of setting into motion the processes of assimilation and accommodation for a particular area of exploration.

2.2.2 Affective Approach

Affective domain (Krathwohl, Bloom, and Masia, 1973) involves the way humans tackle things and incidents emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes.

Emotions play an important role in life and contribute to the personal and social development of an individual. Continuous emotional disturbance affects the individual's growth and development and gives rise to mental, physical, social and other problems. It hampers intellectual training. On the other hand, an emotionally stable individual leads a happy, healthy and peaceful life. The individual is then at ease with ourself, the surroundings and other fellow beings. Therefore, the development of emotions is extremely important for the harmonious development of the personality of an individual. Emotions influence all aspects of an individual's personality. Proper training and education will go a long way to enable the young people to control their emotions and obtain mental balance and stability. Emotions are the prime motive forces of thought and conduct and their control is very important. It has been rightly said, 'To keep ones emotions under control and be able to conceal them is considered a mark of strong character.'

Child A is a *happy* child.

Child B gets *angry* over small things.

Child C always looks *sad.*

Child D is very *jealous* of his younger brother.

All these children show signs of expressing emotions.

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Meaning of emotions

Etymologically the word emotion is derived from the Latin word emovere which means to stir up, to agitate or to excite.

R.S. Woodworth (1945), by making use of this explanation has defined emotion. as, 'Emotion is a moved or stirred up state of an organism It is a stirred up state of feeling that is the way it appears to the individual himself. It is a disturbed muscular and glandular activity—that is the way it appears to an external observer.'

According to Crow and Crow (1973), 'an emotion is an effective experience that accompanies generalised inner adjustment and mental and psychological stirred up states in the individual, and that shows itself in his own behaviour.'

William McDougall (1949) says, 'An instinct is an inherited or innate psycho-physical disposition which determines its possessor to perceive and to pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or, at least, to experience an impulse to such an action.' This statement gives us the nature of emotions as well. According to McDougall, an instinctive behaviour has three aspects: (i) cognitive or knowing or perceptual aspect. (ii) affection or feeling or emotional effect. (iii) conative or doing or strivjng or executive, active or behavioural aspect.

Let us take an example. A child sees a bull coming towards him. He experiences an instinctive fear and undergoes the above three processes. Firstly, he perceives the bull, secondly he experiences an emotion of fear and thirdly he tries to run away. It is, therefore, concluded that an emotion is an affective experience that one undergoes during an instinctive excite-ment.

McDougall discovered fourteen basic instincts and pointed out that each and every emotion, whatever may be is the product of some instinctive behaviour.

The instincts in their alphabetically order with their associated emo-tions are listed as under:

***Table 2.1** Instinct and Emotions*

S. No.	*Instinct*	*Emotion Accompanying an Instinct*
1.	Acquisition	Feeling of ownership
2.	Appeal	Distress
3.	Construction	Feeling of creativeness
4.	Curiosity	Wonder
5.	Flight or Escape	Fear
6.	Food seeking	Appetite
7	Gregariousness	Feeling of loneliness
8	Laughter	Amusement
9.	Parental	Tenderness, Love
10.	Pugnacity or Combat	Anger
11.	Repulsion	Disgust
12.	Self-assertion	Positive feeling or Elation
13.	Sex, Mating	Lust
14.	Submission	Negative feeling

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Kimball Young notes, 'Emotion is the aroused psychological state of the organism marked by increased bodily activity and strong feelings directed to some subject.'

Chief characteristics of emotions

1. The emotional experiences are associated with some instincts or biological drives.
2. Emotions, in general, are the product of perception.
3. The core of an emotion is feeling which is essentially linked withsome sort of urge or impulsive act to do. There is only a difference of degree between feeling and emotion.
4. Every emotional experience involves several physical and psychological changes in the organism Some of these changes like the bulge of the eyes, the flush of the face, the flow of tears, and the pulse rate, are easily observable. There are also internal physiological changes like circulation of blood, the impact on the digestive system and the changes in the functioning of some glands, etc.
5. Emotions are frequent.
6. Emotions are expressed in relation to the concrete objects or situa-tions.
7. Emotions are temporary.
8. Emotional expressions in early childhood are intense irrespective ofthe intensity of the stimulus.
9. Small children fail to hide their emotions and express them indirectly through different activities like crying, nail-biting, thumb-sucking and speech difficulties.
10. Emotions are prevalent in every living organism.
11. Emotions are present at all stages of development and can be aroused in young as well as in old.
12. Emotions differ from person to person.
13. Same emotion can be aroused by a number of different stimuli-objects or situations.
14. Emotions rise abruptly but die slowly.
15. Emotions are subject to displacement. The anger aroused on account of one stimuli gets transferred to other situations. The anger caused by the rebuking of the officer to his subordinate may be transferred in beating the children at home.
16. One emotion may give rise to a number of likewise emotions.

Effects of emotions on the developing individual. Following are the important effects of emotions on the developing individual:

1. Emotions provide energy to an individual to face a particular situation.
2. Emotions work as motivators of our behaviour.
3. Emotions influence our adjustment in the society

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4. Highly emotional conditions disturb the mental equilibrium of an indi-vidual.
5. Highly emotional conditions disturb the reasoning and thinking ofanindividual.

Inter-relation of physical and emotional factors. There is a close relationship between the physical and emotional factors. An imbalance or disturbance in the child's physical growth is most likely to be reflected in his intellectual functioning and personality adjustment. An unhealthy emotional climate is likely to affect the physical health of the child and it may hinder his normal physical growth. A child under emotional strain is likely to be physically unhealthy and show signs of physical ailments. This relationship is illustrated in the following figure.

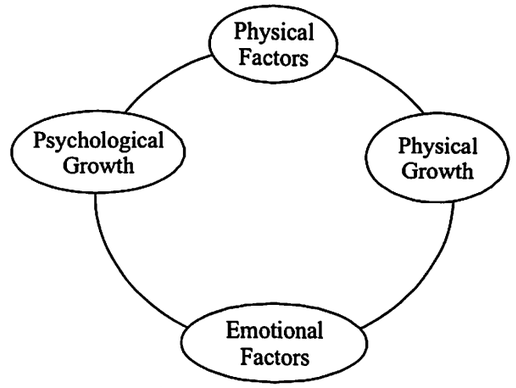


Fig. 2.1 Inter-relation of Physical and Emotional Development.

Kinds of emotions: Positive and negative

Emotions, in general can be categorised into two kinds—positive emo-tions and negative emotions like affection (love), amusement, curiosity, happiness and joy which are very helpful and essential to the normal behaviour are termed as positive emotions. Unpleasant emotions like anger, fear and jealousy which are harmful to the individual's development are termed as negative emotions.

It should be borne in mind that it is not to be assumed that all the positive emotions are always good and the negative emotions are bad. Excess of everything is bad. Whether an emotion will prove to be helpful or harmful to an individual depends upon the following factors:

(i) The frequency and intensity of emotional experience.

(ii) The situation, occasion and the nature of stimulus which arouses the emotion.

(iii) Kind of emotional experience.

Emotions with too much intensity and frequency whether positive or negative bring harmful effects. Emotions may be external or physiological and internal or psychological. Important signs of emotions in an individual include increase in heart rate, rise in blood pressure, occurrence of changes in blood composition, and increase in respiration, hair standing on end, dilution of eye-pupil, increase in muscle tension, increase in perspiration.

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Difference in children's emotions and adult's emotions

1. Children's emotions are frequent. They are angry and happy several times a day. This is not the case with adults.
2. Children's emotions are brief. Their duration is short. Adult's emotions are of longer duration.
3. Children's emotions are transitory and there is a shift in emotions.
4. Children's emotions are relatively intense. If a child is to weep, she weeps aloud. Intensity is not observed in the emotion of adults.
5. Children usually express their emotions. On the other hand, adults may try to conceal their emotions.

Approximate ages at which different emotions appear

Appr Age	*Appearance of Emotion/Emotions*
First month	Excitement
3 months	(i) Distress (ii) Delight
6 months	(i) Fear (ii) Disgust (iii) Anger
12 months	(i) Elation (ii) Affection
18 months	(i) Affection for Adults (ii) Affection for Children
24 months	(i) Jealousy (ii) Joy
5 years	(i) Shame (ii) Anxiety (iii) Fear (iv) Disappointment (v) Envy (vi) Hope.

Symptoms of unsatisfactory emotional development

Some of the more common symptoms of unsatisfactory emotional adjustment are: resistance to learning, speech problems, excessive day dreaming, oversensitivity, extreme dependence on peers or adults, resistance to the requirements of the classroom or the group and temper tantrums.

Understanding some emotions

Emotion	*Signs*	*Contributory Factors*	*Values Dealing*	*Methods of*
1. **Anger**	(i) Extreme rage (ii) Resentment (iii) Irritation (iv) Feeling of fear, grief, jealousy	1. Unnecessary interference in the child's daily affairs 2. Assignments of tasks beyond his capacity 3. Imagined or real favouritism shown by parents and teachers	1. Sometimes performance of brave tasks 2. Development of insight 3. Change in the attitude of parents	1. Understanding the causes of anger 2. Minimising provocations 3. Restraints on the part of elders 4. Changing the programme
2. **Fear**	(i) Trembling (ii) Crying (iii) Running away	1. Sight of an abnormal object and animal 2. Loud sound or flash of light etc 3. Strict discipline 4. Unfamiliar persons or things 5. Fear of darkness 6. Fear of being alone 7. Fear of ghosts 8. Failure in examination or in some important task.	1 Safeguards against harm 2. Developing cautious approach 3. Hardwork 4. Punctuality 5. Change in the outlook of elders.	1. Narration of examples setbyothefs 2. Encouraging childre to face situations boldly 3. Showing love 4. Sympathetic approach 5. Appropriate discipline.
3. **Jealousy**	(*i*) Kicking (*ii*) Biting (*iii*) Pinching (*iv*) Scratching (*v*) Bed-wetting (*vi*) Thumb sucking (*vii*) Refusal to eat.	1. Feeling of getting less attention 2. Comparison with the performance of others.	May lead to hardwork.	1. Showing affection 2. Fair treatment 3. Avoiding undue competition.

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Theories of emotions

Important theories advanced to explain the nature and origins of emo-tions are:

1. McDougall's theory of emotions.
2. James Lange's theory of emotions.
3. Sherrington's theory of emotions.
4. Cannon's theory of emotions.

McDougall's theory of emotions. This theory of emotions tries to relate the stimulus situation to the state of the organism and the bodily situations. An instinct is an innate disposition which determines the organism to perceive a certain emotional excitement of behaviour in relation to that object. The instinctive tendencies determine the end of all activities. According to McDougall, in the operation of an instinct, the first step is cognition—that is perception which is followed by emotion and it is the emotion which gives rise to certain organic changes in the body.

James Lange's theory of emotions. James reverses this process. According to this theory, the experience of emotion is merely a mental reverberation of the massive bodily changes that take place during an organism's response to the situation. Bodily changes follow directly upon the perception of an exciting fact (stimulation) and our

feeling of these changes as they occur in emotions. The sequence, according to 7traditional theory is: situation—mental state—bodily expression. James Lange's theory rejects this sequence and states this sequence: situation—bodily disturbance— men-tal state. In other words, we should not say 'we meet a bear, are frightened and then run' rather we should say 'we meet a bear, we run and we are frightened.' Therefore, James Lange's theory may be said to insist on two propositions: (1) that emotion is nothing but an organic sensation and (2) that bodily expressions and organic disturbances, which are said to be effects of emotions are really their causes.

Sherrington's theory of emotions. C.S. Sherrington performed certain nerve-cutting operations on his laboratory dog and came to the conclusion that animals gave evidence of emotional character and showed anger, disgust, fear and joy. These experiments indicated that the emotions were not the results of some organic changes in the body. Organic changes can even be produced artificially without the presence of emotions

Cannon's theory of emotions. W.B. Cannon made a physiological experiment on a cat. He cut off the sympathetic nerves of the cat making impossible the organic state of anger dependent on those nerves. He concluded that the bodily changes are neither consequents nor antecedents of conscious states: they are simply the accompaniments.

Factors influencing emotional development

Emotional development of an individual is influenced by a number of factors—health and physical development, intelligence, family environment, school environment, peer groups' environment, neighbourhood, community and society's environment

1. **Health and physical development of an individual.** There is a positive correlation between health and physical development and emotional development. Any deficiency in health and physical development— internal or external leads to emotional disturbance. Children who are weak in structure or who suffer occasional illness are more emotionally upset and unstable than children whose health is better. Any abnormal increase or decrease in the normal functioning of the glands creates obstacles in the proper emotional development.
2. **Intelligence and emotional development.** H. Meltzer (1937) as quoted by E.B. Hurlock has observed, 'There is less emotional control, on the average, among those of the lower intellectual level than among children of the same group who are bright.' An intelligent person, with his thinking and reasoning powers, is in a better position to exercise control over his emotions.
3. **Family environment and emotional development.** A cordial environment i.e. healthy relationships between the parents is very conducive to the emotional development of the child. The treatment meted out to the child by the parents and other members of the family influences his emotional development. The order of birth (whether the first or the younger child), sex (son or daughter), size of the family, socio-economic status of the family, discipline in the family, the parental attitude towards the child (pampered, overprotected or neglected)— all are important factors in the emotional development of the child.
4. **School environment.** The attitude of the teachers, school discipline, academic facilities available, physical facilities, methods of teaching, and co-curricular activities—all influence emotional development of children.

5. **Peer group relations and emotional development.** The influence of the classmates and other members of the group affects emotional development.
6. **Neighbourhood, community and society's environment and emotional development.** A child lives in the society and picks up so many traits of emotional behaviour from the surroundings.

Educational implications of emotional development

There are several situations and things at home and school which make a child unhappy rather than happy. It is common to note that children experience too many unpleasant emotions like anger, fear and jealousy than positive emotions of affection, joy and pleasure. Here it may be stressed that it is the experience of positive emotions that helps the child to develop a positive outlook on life. However, it is also true that the experience of only positive emotions in life is not always possible for everyone. One does come across a number of both pleasant and unpleasant situations. This means that a child must learn to accept unpleasant emotional experiences in such a way as he does not show undue concern and disturbance. He must learn to adjust himself to such experiences, situations, events, ideas and persons that cause annoyance. But as far as possible, the home and the school should create more and more situations in which pleasant experiences predominate.

Following suggestions are offered to help children's emotional balance:

1. E.B. Hurlock states five causes which disturb emotional stability—
   (a) **Fatigue:** Tired children are difficult to handle. Therefore, efforts may be made not to cause undue fatigue to them.
   (b) **Poor health:** Children with poor health are irritable. Hence, health of the children should be properly looked after.
   (c) **Association with emotional people:** Children imitate the behaviour of their elders—parents, teachers and other adults and peer groups. Suitable examples of emotional stability should be presented by the elders.
   (d) **Thwarted desires:** The more restrictions are imposed on children, the more revolting they become. This means that a suitable disciplinary mechanism should be evolved.
   (e) **Unpreparedness:** A child shows emotional outbursts when she is faced with a strange situation or for which she is not prepared. Proper training to face such situations needs to be given gradually.
2. Children should be helped to express their emotions in a natural way.
3. Children should be helped to develop a realistic understanding about the situations that arouse unpleasant situations.
4. Children should be helped to learn how to control their feelings which may offend others.
5. Children should be gradually directed to exercise more of internal self control.
6. Counselling may be useful in cases of highly disturbed emotional states of minds.

Development of emotions and maturity

Certain instincts with their corresponding emotions are lying dormant in early stages but are matured afterwards. The sex instinct is the most important one which is lying in a latent state in childhood and consequently lust, its corresponding emotion, is also not apparent at that time. But during the period of adolescence when the hormones of sex glands begin to work the distinct is stirred up along with its emotion. The child does not carry any fears when he is born. But further experiences and conditioned reflexes beware him of many risks and dangers and he begins to develop many fears, real as well as imaginary. Some emotions begin to be weaker in maturity. With maturity the child learns to control and moderate his emotions. He learns how to dominate over his crude and wild emotions with the help of noble sentiments which are themselves organized forms of various emotions.

Role of education in the emotional development of children

The main aim of education is to modify and direct the behaviour of the child so that he becomes a useful member of the society. In this task, instincts and their potential allies i.e. the emotions have to be refined by training and education.

There are some emotions often based on temporary or imaginary dangers, which are constantly stirring up the child. These are worry and fear. Every emotion is taxing and tiresome for the child as it produces tension both mental and physical, and wastes energy. If this tension continues for a long time it causes damages to the child. Therefore, it is our duty to see that children are not harbouring these dangerous emotions. Anger is another furious emotion which is dangerous to the health of the child and also to the peace of the society. We should redirect it to useful channels. Hatred is also a devilish trend and needs sublimation.

Character formation of children is one of the main duties of the teacher. We can succeed in this aim only if we harness various emotions and synthesize them into sentiments and master sentiment. Strong will power also depends upon the synthesis of emotions.

Training and modifying emotions

Emotions can be modified through the following devices:

1. **Redirection:** An emotion is dynamic in nature and cannot be suppressed totally. It cannot be destroyed. It is just like a tumultuous stream which cannot be obstructed permanently without giving some outlet. But as we can harness a wild stream by building a dam against it and giving new channels to the powerful waters, quite in the same way, emotional waves can also be rechannelled for the advantage of the organism itself and for the whole society to which he belongs. Let us take the example of anger'. It is a furious emotion. It exists in its wild form in every organism. We have simply to tame and redirect it to broad and beneficial channels for the benefit of the person and the society.
2. **Sublimation:** Sublimation is also a sort of redirection with this difference only that in the former case the emotion does not lose its original form while in the latter case it is so much elevated that it changes its form. It takes up much nobler and higher form. Lust is transformed into love for fine arts or social services or devotion to some deity. Anger turns to be zeal and enthusiasm. Fear takes the form of anxiety for the betterment of mankind.
3. **Catharsis:** Intensity of emotions is dangerous for health, especially when they do not find expression. Even their expression in original form is very costly for the mind and the body. Therefore, catharsis of pent-up emotions is necessary for the well-being of the organism. Play and extra- curricular activities are very useful devices for this purpose.
4. **Inhibition:** Human life is very complex in the present civilization. We need to control our emotions at every step. Redirection, sublimation and catharsis are not possible always and at every moment. Often we have to suppress our emotions for a short time or for a long time. It can be done with the help of strong will. But we should know that inhibition should not be permanent and we should give some outlet to the pent-up emotions as soon as possible.
5. **Mental occupation:** Empty mind is a devil's workshop. If a child is busy in some mental or even physical activity, other stimuli cannot disturb his emotions. Moreover, he is already undergoing the process of catharsis. Even if his emotions are stirred up when he is quite exhausted after enough mental activity, the stimulation will not be too intense for him.
6. **Positive suggestions:** Suggestions may be used as an effective tool by the teacher for the formation of positive sentiments in pupils. Negative suggestions should be avoided.
7. **Affectionate environment:** For healthy emotional development, child should be given a feeling of belongingness and security by sympathetic behaviour and affectionate attitude.
8. **Example is better than precept:** The parents and teachers should reflect maturity in expression of emotions. Whatever form of behaviour is expected from the students, the teacher should adopt the same in his own dealings.

2.2.3 Psychomotor Approach

The psychomotor domain includes physical movement, coordination, and use of the motor-skill areas through use of sensory cues. These range from sensory stimulation, through cue selection to translation. Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution.

'Healthy mind in a healthy body' is an old adage and is true to the core. The physical development of the child is very important for a number of reasons. Appropriate physical development makes valuable contribution to the all-round development of an individual. When a child is busy in some physical activity, he is emotionally as well mentally involved in it. Physical development of the individual is important both for the individual and social development. It is also important for ethical, moral and spiritual development. A physically unhealthy person, other things being equal, is unable to perform his duties to wards ourself, to the community.

By not giving proper attention and care to the physical development of the child, we may be guilty of causing serious handicaps to the total development of the

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child, including his emotional, intellectual and social, even ethical and spiritual. A knowledge of the process of the physical growth of the child and development will enable the teacher to equip him for setting his programmes according to the needs of the children.

Meaning and dimensions of physical growth and development

Physical growth and development refers to a process which brings about bodily and physiological changes—internal as well as external—in an organism from the conception till his death. Generally, these changes take place in the following dimensions:

(i) **Gross physical structure or physique:** It involves changes in height, weight, body proportions and general physical appearance.

(ii) **Internal organs:** It involves changes in the functioning of glands, nervous system and other body systems—circulatory, respiratory, digestive, muscular, lymphatic and reproductive

Although there are wide individual differences among children, yet physical growth and development seems to follow to some extent a general pattern. This general pattern of development and growth may be summarised as under.

(i) **Increase in height and weight:** The table illustrates increase in height and weight at different ages.

On the average, at birth a baby is about 56 cm in height and between 4 and 5 kg. in weight, boys being sightly taller and heavier. During the first two years, there is rapid increase in both height and weight There is a steady and slower growth from the third year till the on-set of puberty. By five years the height of the child, approximately increases by 80 per cent and he acquires almost *VA* times his birth weight. During the period of adolescence we again find a sudden increase in both height and weight. Girls reach puberty about a year or two earlier than boys do. Therefore, at the age of 12 they are found slightly taller and heavier than boys. But they are again surpassed by the boys at about the age of 14. By the end of adolescence, the young men are generally higher and heavier than the young women. Generally both men and women get their maximum height and weight upto the end of adolescence. But there are very much variations in weight as it is more susceptible to environmental influences. Therefore, it is no surprise to note the sudden increase or decrease in weight in later years after attaining maturity.

Weight of the brain increases rapidly in the early years of life. By the time the child completes the age of four his brain gains almost 80 per cent of its final weight, another 10 per cent being added by the time he com-pletes his eight years. By the 20th year, the brain gains almost all its weight.

(ii) **Changes in body proportions.** There are changes not only in the size of the body of the child but also marked changes in the proportion of the different parts of the body. For instance, the head constitutes about one-fourth of the height of the body at birth. The size of the head is relatively much larger than tha arms and legs. As the child grows older, the proportion of the head decreases.

By the end of the adolescence, head becomes one-eighth of the body. The other parts of the body, legs, arms, etc. also change in proportion.

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Table 2.2 Mean Height and Weight of Male and Female Children (All India)

Age Group	*Mean Height (cm.)*		*Mean Weight (kg.)*	
	Male	*Female*	*Male*	*Female*
3 months	56.2	55.0	4.5	4.2
4-6 months	62.7	60.9	6.7	5.6
7-9 months	64.9	64.4	6.9	6.2
10-12 months	69.5	66.7	7.4	6.6
1 year	73.9	72.5	8.4	7.8
2 years	81.6	80.1	10.1	9.6
3 years	88.8	87.2	11.8	11.2
4 years	96.0	94.5	13.5	12.9
5 years	102.1	101.4	14.8	14.5
6 years	108.5	107.4	16.3	16.0
7 years	113.9	112.8	18.0,	17.6
8 years	119.3	118.2	19.7	19.4
9 years	123.7	122.9	21.5	21.3
10 years	128.4	128.4	23.5	23.6
11 years	133.4	133.6	25.9	26.4
12 years	138.3	139.2	28.5	29.8
13 years	144,6	143.9	32.1	33.3
14 years	150.1	147.5	35 7	36.8
15 years	155.5	149.6	39.6	36.8
16 years	159.5	151.0	43.2	41.1
17 years	161.4	151.5	45.7	42.4
18 years	163.1	151.7	47.4	42.4
19 years	163.5	151.7	48.1	42.4
20 years	164.1	151.7	49.2	43.5

Source: Growth and Physical Development of Children.

All India - Indian Council of Medical Research. New Delhi, 1968.

Common causes of delayed motor and physical development

1. Poor physical conditions caused by illness, and malnutrition.
2. Lack of opportunities to develop manual skills.
3. Nagging, scolding and ridiculing of the child by parents and teachers when he does not succeed in an activity.

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Factors affecting physical growth and development

1. The traits and characteristics inherited at the time of conception.
2. The physical as well as mental health of the mother during pregnancy.
3. Nutrition received by the embryo within the womb of the mother.
4. Conditions and care at the time of delivery.
5. Normal or abnormal delivery.
6. Single birth or multiple births.
7. Care of the baby and its mother.
8. Presence or absence of physical defects.
9. Presence or absence of illness and diseasi
10. Proper or improper medical care.
11. Nutrition received by the child after birth
12. The living conditions—physical, social and cultural.
13. The opportunities for recreation, self expression, play and exercise.
14. Adequate or inadequate rest and sleep.
15. Emotional and social adjustment of the child.

Suggestions for the guidance of parents and teachers

It has been observed by W.F. Dearborn, "There is organic need for strenuous, and physical activity. Skeletal muscles are developing and require exercise. Nine to eleven years old dash breathlessly from place to place, never walk when they can run, never run when they can jump or do something more strenuous."

Some of the important activities which facilitate physical development are:

1. Provision of nutritious diet.
2. Regular medical check-up and follow-up.
3. Provision of healthful environment.
4. Free and guided play activities.
5. Activities involving handling of tools and materials,
6. Exercise and morning walk.
7. Yogic exercises.
8. Preparing charts and models.
9. Proper postures.
10. Games and sports.
11. Opportunities for skipping, hoping, jumping, throwing, grasping, etc.
12. Excursions.
13. Community cleanliness programmes.

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Motor development

Motor development may be defined as the development of strength, speed and accuracy in the use of muscular parts of the body such as arms, eyes, legs and neck muscles. Motor abilities involve bodily movements of various organs and co-ordinated functions of nerves and muscles. Skill in motor activity depends on not so much on gross body movements but fine coordination of the smaller muscles. Motor development is closely related with emotional, mental, physical and social development

Motor development starts since pre-natal period. Adequate motor development during the prenatal period provides the neonate (newborn baby), great potentiality to be active. Movements of the fetus are reported during the third month and these are considered fundamental to later development. The world of the infant expands and the stimulation increases greatly when he learns to move about by the end of the first year.

One of the most important responses shown by a newborn is called Moro reflex. When there is a sudden change in the head position of the infant, he throws his arms out to the side and then brings them back, as if he were embracing someone. Any sudden change in stimulation, like hitting the sides of the pillon elicits the Moro reflex. It vanishes when the infant is three or four of age. As the infant matures she is able to exercise control over her various parts and coordinate functioning of nerves and muscles. Studies done by C.B. Skinner and P.L, Harriman (1941) and Mar. M. Shirley (1960) report the developmental sequences of sitting up, standing and walking.

Motor development characteristics

Three years: A child

1. Manipulates play materials
2. Alternates feet going upstairs
3. Rides a tricycle
4. Counts to three
5. Feeds self with little spilling
6. Throws objects overhead
7. Fashions objects with clay
8. Stands on one foot
9. Jumps upward

Four years

1. Skips on one foot
2. Laces shoes
3. Dresses and undresses
4. Cuts on lines with scissors
5. Runs broad jump

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6. Saws with handsaw
7. Throws overhead with less body participation

Five years

1. Tics shoe laces
2. Skips on alternate feet
3. Draws recognizable figures
4. Picks up small items skilfully
5. Draws alphabet letters

Six years

1. Engages in all five-year activities but with more skill and feeling
2. Throws and catches ball
3. Climbs up rope, swings
4. Builds blocks shoulder height with lighter touch
5. Cuts, pastes, models and colours skilfully
6. Builds crude items in workshop

Principles of motor development

1. Development takes place from head to tail. This principle explains that head starts developing first, and other parts of the body in the direction of legs mature later.
2. Development takes place from near to far. This principle states that parts near the brain or spinal cord will develop earlier to which are those away from spinal cord such as arms and fine muscles of the fingers.
3. Development of specific movements proceeds from mass activity. The newborn babies tend to move away their whole body later on. As they develop, they are able to move a specific body part.
4. Both motor coordination and strength increase with age.
5. The development of motor skills depends not only on neuro-muscu- lar maturity but also on environmental opportunities, particularly the availability of equipment, the opportunity to observe and imitate other children and the opportunity to experiment.

Sex difference in motor development. The development level for doing or performing a task increases with age. However, a wide variation in the motor ability of children of the same age is noticed after infancy. This variation is more pronounced if there is difference in the sex of children. The average boy is superior to the average girl in tests of strength, speed and in many motor skills. These differences are aggravated with the increase in age. Girls further reach their maximum at about the age of fourteen in the ability to perform motor acts, while the boys continue to improve even upto eighteen years. Boys are found to be superior to girls in activities that require brute force and speed. Girls surpass boys in activities requiring greater concentration, accuracy and precision and delicate coordination. In activities like badminton, tennis, table tennis, folk dance, and dramas both girls and boys can participate on almost equal footing.

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2.3 NATURE OF TEACHING-LEARNING PROCESS

Teaching—learning has four aspects: teacher, student, learning process and learning situation. The teacher creates the learning situation for the student. The process is the interaction between the student and the teacher. Teaching and learning relationship or interaction may be explained with the help of a diagram.

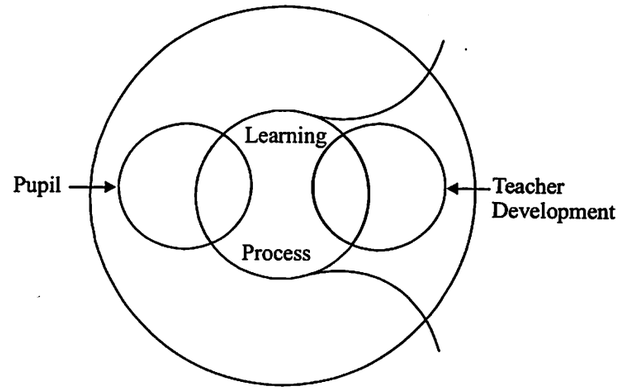


Fig. 2.2 Teaching-learning Process and Teacher-taught Interaction.

Teaching-learning process is a means through which the teacher, the learner, the curriculum and other variables are organised in a systematic manner to attain pre-determined goals and objectives.

Teaching-learning process implies that all the various elements of the teaching-learning situation have to be brought into an intelligible whole. The teaching-learner activities which are varied and complex have to be harmonised. These elements and activities include learners and their individual differences, the methods of teaching, the material to be taught, classroom conditions, teaching devices and aids, questioning and answering, assignments, thinking, enjoying, creating, practical skills, discussions and many others.

Teaching-learning process is influenced by the totality of the situation. Teaching learning is fruitful and permanent if the total situation is related to the life situations. Teachers can play an important role in facilitating learning when they take into account the needs of the learners.

Teaching-learning process is a means whereby society trains its young ones in a selected environment (usually the school) as quickly as possible to adjust themselves to the world in which they live. In primitive societies this adjustment meant conformity with the things as they were. In advanced civilisation of the modern times, effort is made not only to adjust to things as they are but also to make an advance in the improvement of conditions of life by training the young in the modes of thinking and acting which will help to improve the conditions of living that surround them.

Check Your Progress

1. Why is education regarded as a tripolar process?
2. What did Gandhi say about self-realization of education?
3. Who propagated the cognitive approach?
4. Give any one meaning of emotion as described by psychologists.
5. What is meant by physical growth and development?
6. Define motor development.

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Teaching-learning process is as old as human beings on earth. It has been carried out not only by human beings but also by animals to teach their young ones to adjust themselves successfully with their environment. With the passage of time, it has undergone revolutionary changes.

If the teaching-learning process is effective, then the child is able to make the best use of the things in the world around him. If a child has not learnt the art of living harmoniously with others, he will find himself beset with more difficulties than the person who has learnt how to establish social relations with his fellows. So, the acquisition of knowledge, skills and attitudes which enable us to adjust ourselves in an effective manner to the environment may be said to be the aim of teaching-learning.

Important aspects of the teaching-learning process

Teaching and learning are interlinked. We cannot think of teaching without learning. The teacher teaches and the students learn. Teaching is not in a vacuum. It is obvious that for making teaching-learning sound and effective in our educational institutions, we must look into its various aspects very carefully and critically so that they contribute in making teaching-learning inspirational and relevant. Following are the chief aspects.

1. Command, planning and organisation of the subject matter or content and activities: There are no two opinions about the important factor that the success of the teaching-learning process greatly depends upon the thoroughness of knowledge of the subject matter to be taught by the teacher. The soul of effective teaching learning is good command of the subject matter.

The next aspect is to present the subject matter to the class. Here we enter into the field of organisation of the subject-matter and the use of methods of teaching and teaching technology. The teacher's endeavour will be to use different dynamic and progressive methods of teaching and learning. He should encourage the students to develop proper habits of learning. He should stress self-learning on the part of the students.

2. Class control and discipline: Appropriate class control and discipline is one of the most important characteristics of a successful teacher.

A good teacher is one who can control his class not through fear or high handedness but by virtue of his interest in the learner, good command on the subject-matter and the ability to present it interestingly and effectively. The learners also appreciate good teaching and cooperate with the teacher in the teaching-learning process.

3. Psychology of learners: A teacher must realized her/ his knowledge of the subject-matter, ability to present it methodically and effectively and ability to control the class situation ably, teaching-learning will be effective only if he takes into consideration the interests, abilities, aptitudes and limitations of the learners. A teacher must learn to understand his learners and encourage them. She/he has to be sincere and honest towards the learners. An ideal teacher is always humble. The has to practise tolerance and patience in dealing with the learners. The participation of the learners is equally important and necessary.

4. Evaluation: Evaluation has an important place in the teaching-learner process. A teacher should carefully evaluate his students to find out how they can make more

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progress. He may use a variety of methods for this purpose. Self-evaluation by both the teacher and the student in very important.

Traditional teaching-learning process and the modern teaching-learning process

Modern teaching-learning process assigns an important place to student activity. It calls for a child-centred approach. The most distinctive feature of modern society is its science-based technology which has been making a profound impact not only on the economic and political life of a country but also on its educational system. The changes that occur as a result of the impact are broadly described as 'modernisation'. This modernisation has affected the teaching-learning process in many ways. The recent changes in the concept of teaching-learning process have led to the development of newer ares of educational endeavour. In a traditional society the aim of teaching-learning was the preservation of the accumulated stock of knowledge. But in the modern society, the main aim of teaching-learning is not acquisition of knowledge alone. It is the awakening of curiosity, the stimulation of creativity, the development of proper interests, attitudes and values and the building of essential skills such as independent study. Teaching-learning process has to serve as a powerful instrument of social, economic and cultural transformation of the society. Teaching-learning process is conditioned by the nature and demands of society to which the learner should get adapted and attuned. One of the main aims of teaching-learning in the modern society is to keep pace with the advancement of knowledge and skills.

For a pretty long period, the teaching-learning process has been by and large, a process dominated by the institution of professional teachers. Now, the process is to be replaced to a great extent by a process in which the individual learner is expected to take up challenges through an inevitable intellectual revolution. The intellectual revolution has been set in by forces of hardware technologies at lowcost, and socialization process due to interdependence. Besides, projects, farms, factories, markets, excursions and play-grounds will become classrooms in the new teaching-learning process.

2.3.1 Teaching Learning: A Three-way Communication

Interaction between the teacher and the learners is the core of the teaching-learning process. This interaction through a sort of three-way communication, results in behaviour changes in the learners. (See figure 2.3)

A learner needs the help of a teacher when he wants to learn any subject and to solve any problem. The process of guiding the learner involves eight steps—communication from the teacher to the learner (steps 1 and 2), from learner to teacher (steps 3 and 5) and again from teacher to learner (steps 6 to 8). Through this three-way communication, teacher could direct his course of teaching concretely. On the other hand, learner can know how well his learning is progressing and how sure he can make his way of learning. So, teacher should establish firmly this three-way communication between many learners and himself.

The formative evaluation in step 7 and KR in step 8 are important to conduct the effective teaching learning processes. KR is a kind of feedback information which has

many types. For example, in responding to his behaviour, teacher, says: 'good,' 'wrong,' 'no', 'well', 'huum' 'wonderful', 'interesting' and some-times repeats and summarizes learner's opinions. Sometimes teacher gives many non-verbal KR, nodding, smiling, winking, and making gestures.

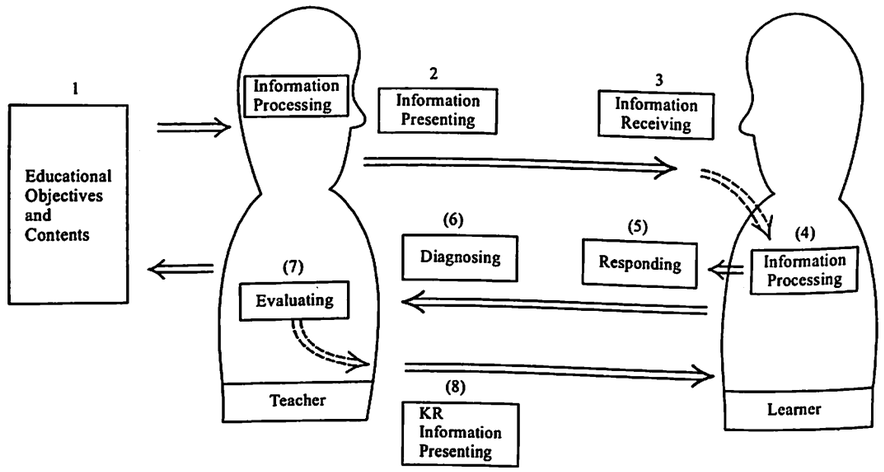


Fig. 2.3 Teaching-learning Process Consisting of 8 steps

Teaching learning and evaluation

Teaching remains central to both learning and evaluation. There is an inter-relation between teaching objectives (ends), learning experiences (means) and evaluation (evidence of what is taught and learnt). Evaluation is the process of determining (i) the extent to which an objective is achieved (ii) the effectiveness of the learning experiences provided in the classroom and (iii) how well the goals of teaching have been accomplished.

- In evaluation, one has to know where students were at the beginning if we are to determine what changes are occurring.
- In evaluation one has to obtain a record of the changes in pupils by using appropriate methods of appraisal.
- In evaluation one has to judge how good the changes are in the light of the evidence obtained.
- Evaluation may lead to changes in teaching technology and also in learning technology.

Thus, evaluation comes in at the planning stage when teaching objectives are identified. At every point of learning, evaluation is an attempt to discover the effectiveness of the learning situation in evoking the desired changes in students.

Evaluation is integrated with the whole task of teaching and learning and its purpose is to improve learning and not merely to measure its achievement. In its highest sense, evaluation brings out the factors that are inherent in student growth such as proper attitudes and habits, manipulative skills, appreciations and under-standing in addition to the conventional acquisition of knowledge.

It has been rightly observed, "The definition of evaluation places it in the stream of activities that expedite the educational process; these activities can be reduced to four essential steps: identification of educational objectives, determination of the experiences students must have to attain these objectives, knowing the pupils well enough to asign appropriate experiences and evaluating the degree to which pupils attain these objectives."

Objectives provide the starting point on which are based all the learning experiences which in their turn are the material ofevaluation.

Teaching objectives: Our'teaching objectives are the changes we wish to produce in the child. The changes that must take place through education are represented in:

1. The knowledge children acquire.
2. The skills and abilities children attain.
3. The interest children develop.
4. The attitudes children manifest.

If education imparted is effective, then the child will behave differently, from the way he did before he came to the school. The pupil knows something of which he was ignorant before. He understands something which he did not understand before. He can solve problems he could not solve before. He can do something which he could not do before. He revises his attitudes desirably towards things.

Specific classroom objectives: These objectives must involve points of information, the skills and attitudes to be developed and interests that could be created through the particular topic or subject taken up for work in the classroom:

A statement of classroom objectives;

(1) serves as a basis for the chorus of classroom procedures that should provide for suitable experiences to the children.

(2) serves as a guide in seeking evidence to determine the extent to which the classroom work has accomplished what it set out to do.

Learning experiences: A learning experience is not synonymous with the content of instruction or what the teacher does. Learning results from the active reaction of the pupil to the stimulus situation which the teacher creates in the class. A pupil learns what he does. He is an active participant in what goes on in the class. Changes in a pupil's way of thinking and developing concepts, attitudes and interests have to be brought about gradually. No simple experience will result in the change. Many experiences, one reinforcing another, will have to be provided. They may have to be repeated in increasing complexity or levels in meaningful sequence extended over a period of time. A cumulative effect of such cxperiences will evoke the desired change of behaviour with reference to a specific objective.

The following consideration will be useful in the selection of such experiences:

1. Are they directly related to goals?
2. Are they meaningful and satisfying to the learners?
3. Are they appropriate to the maturity of the learners?

Teaching, learning and improvement: It is worth bearing in mind that learning is what students do, teaching is what the academic staff does and that improvement in

teaching can only be demonstrated if there is consequential improvement in learning. On the other hand, improvement in learning may occur for reasons that have nothing to do with teaching, for example students are able to spend more time, gain better access to libraries and become more strongly motivated.

As observed by prof. R.S. Adams and others, "Students may learn what the teacher intended them to; they may not. Further, teachers, like others, are fallible, they may not always teach correctly. It follows then that in any learning situation, students may learn correctly what the teacher taught incorrectly or may learn incorrectly what the teacher taught correctly—or fortunately, the opposites."

Finally, although students do learn because of the instruction they receive, they also learn in spite of the instruction they receive. In the process of accommodating to what is being taught students attempt to 'fit' the new experience into their past experience—into the knowledge, insights and understandings that they have accumulated previously. It is this capacity of human beings to transcend their immediate circumstances, to add into their 'learning', their past experiences, that complicates the instructional process and makes it difficult for teachers to tailor the learning experience appropriately for their (unusually diverse) students. As a consequence, instructional strategies are often based on different assumptions. Some deliberately set out to exercise control over the learner by: (i) either trying to exclude outside influences; or (ii) by trying to build beyond them; or (iii) by trying to overpower them. For example some earlier attempts at programme learning tried to confine student attention precisely and exclusively to the material to be mastered. Other more sophisticated mastery learning programmes attempt to both discover and start from what the learner's basic knowledge is and to provide 'branch' programmes catering for individual differences. Operant conditioning, of course, has always represented an attempt to 'override' other influences, however powerful they might be. Outside these more mechanistic strategies, other instructional strategies have been based on other assumptions. For example, where students are expected to learn by emulating their instructors (e.g. as in medical and veterinary training) reliance is placed on observational 'learning.'

Teaching operations and learning operations

Teaching operations and learning operations are interlinked. Nevertheless teaching operations to be successful must take into account the learning operations needed to accomplish the teaching objectives which themselves are based on learning objectives. It is therefore, desirable to consider the learning operations first. Learning operations are as under:

1. Discrimination of stimulus situation
2. Response or cognition
3. Assimilation of relationship between specific elements of the situation and the response
4. Developing application and control over the environment
5. Definite behavioural changes

Teaching operations may be enumerated as under:

1. presentation of stimulus in a specific control
2. Bringing suitable responses by organising appropriate learning experiences.
3. Elucidation and elaboration
4. Setting up drill and review exercises for fixing up the behaviour in the repertoire of learning
5. Evaluating learning outcomes

***Table 2.3** Historical Perspective of Teaching-learning*

Stages of Development	*Aims*	*Concern*	*Context*	*Curriculum*	*Class-room Authority*	*Process*
First Stage	Mortification of soul	Moral	Dominance of faith over wisdom	Ethics, Religion	Religious institutions, churches, etc.	Discourses, Memorization of spoken/ written word
Second Stage	Enquiry into the nature of things and universe	Social and Educational	Renaissance (Reaction to Church dominance)	Logic, ethics, Science of universe	Reformers, Thinkers and their disciples	1. Discourses 2. Experiences 3. Memori-zation
Third Stage	Productive Academic	Political Dominance	Industrialized Society, Vocational	Teacher	Controlled and conditione d learning	
Fourth Stage	Learning and Earning	Socialization of the Individual	Equalization of Opportunities Democratic Ideals and Values	Integrated but more biased towards professional courses	Partnership of teacher-taught	1. Self-learning 2. Programmed learning 3. Group interaction

2.4 TEACHING VARIABLES

Teaching is an important part of the process of education. Its special function is to impart knowledge, develop understanding and skill. Teaching is usually associated with three Rs i.e. reading, writing and arithmetic—imparting knowledge of school subjects. Educa-tion, on the other hand, has a wider connotation in terms of seven Rs i.e. reading, writing , arithmetic (denoting school subjects) and rights, responsibilities, relationships and recreation (new requirements and ideals of a democratic set up). In teaching, we limit our outlook omitting those more important means of education which are involved in the school as a systematically organised social community, including its tone or general moral atmosphere, its government and discipline, and that potent influence—the personality of the teacher. James Welton thinks, "We treat of teaching by itself, because it is an aspect of school life which can be singled out in thought, though it cannot be separated, in reality, from the whole of which it forms a part and because it covers a fairly consistent body of doctrine. It is true that the value and success of all school teaching depends on those wider and deeper elements of

Check Your Progress

7. Define teaching-learning process.
8. Identify the important aspects of teaching-learning process.
9. How do teaching objectives manifest themselves?

school life—tone and discipline—which are omitting. But it is also true that while the latter may be excellent the former may be of poor quality."

Teaching is a relationship which is established among three focal points in education—the teacher, the student and the subject matter. Teaching is the process by which the teacher brings the student and the subject-matter together. The teacher and the taught are active, the former in teaching and the latter in learning.

Modern teaching is not a mechanical process. It is exacting and intricate as well. Teaching is not 'telling and testing'. Teaching is the complex art of guiding students through a variety of selected experiences towards the attainment of appropriate teaching-learning goals.

2.4.1 Structure of Teaching: Three Variables

Structure of teaching consists of three variables which operate in the process of teaching and create learning conditions or situation. These are classified as under:

1. Teacher as an independent variable.
2. Students as dependent variables.
3. Content and the strategy of presentation as intervening variables.

1. Teacher as independent variable: The teacher plans the role of an independent variable. Students are dependent on him in the teaching process. The teacher does the planning, organizing, leading and controlling of teaching for bringing about behavioural changes in the students. He is free to perform various activities for providing learning experiences to students.

2. Student as the dependent variable: The student is required to act according to the planning and organization of the teacher. Teaching activities of the teacher influence the learning of the students.

3. Content and the strategy of presentation as intervening variables: The intervening variables lead to interaction between the teachers and the students. The content determines the mode of presentation—telling, showing and doing.

Functions of variables

The independent and dependent variables perform three functions: (i) diagnostic function (ii) Prescriptive function and (iii) Evaluative function.

(i) Diagnostic function: The initial task in bringing about desirable changes in the behaviour of the students is to have a proper diagnose of the existing situation. Accordingly a teacher has to perform the following diagnostic functions:

(a) Diagnosing the entering behaviour of the students in terms of cognitive, conative and affective abilities.

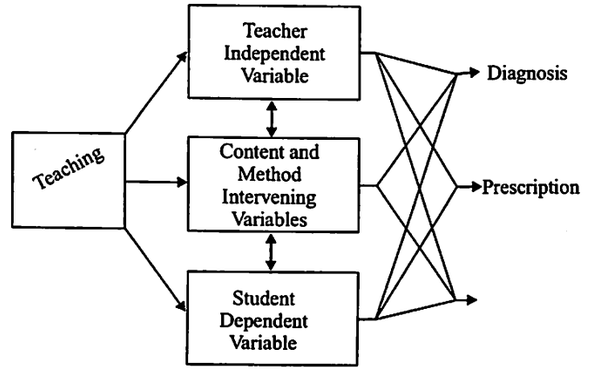


Fig. 2.4 Structure of teaching.

(b) Formulating specific educational objectives, the type and quality of behavioural changes to be introduced in the students in the light of the entering behaviour and environmental conditions.

(c) Analysing the content, instructional material and environmental facilities available for carrying out the task.

(d) Diagnosing his own capabilities and potentialities and bringing about desirable changes in his own behaviour for achieving success in his mission of moulding the behaviour of the students under his charge.

Like the teacher, a student has to perform certain diagnostic functions as listed below:

(a) Diagnosing strength and weakness of his entering behaviour.

(b) Assessing himself in terms of the tools of learning like power of expression, ability to think and analyse, psychomotor skills, and emotional behaviour.

(c) Making efforts to understand the behaviour of the teacher, the type of teaching methods and strategies, the nature of the content and instructional material for the purpose of initiation on his part. In the process of initiation, both the teacher and the student diagnose for initiation and response.

(ii) Prescriptive function: Prescriptive function is based on the diagnosis for achieving the stipulated objectives. In the prescriptive function, teacher is more active. He has to work for meaningful interaction. Cooperation of student is also essential in carrying out the prescriptive function by the teacher. The prescriptive function involves:

1. Selecting appropriate contents and organising them into proper sequence.
2. Selecting proper teaching methods, media and strategies and feed-back devices in view of the individual differences of the students.
3. Seeking desired cooperation from the students for a purposeful interaction.

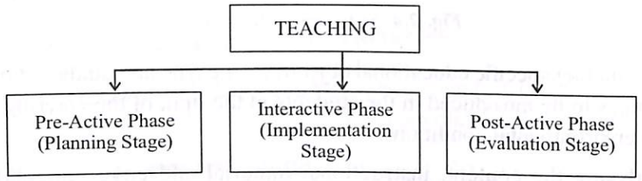
(iii) Evaluative function: Evaluative function is concerned with the task of finding out the progress and outcome of the teaching process. It is done in order to test the diagnostic and prescriptive functions of teaching. Evaluation is very important from the teacher as well as the point of view of the student. Evaluation is conducted with the aid of several measures like tests, inventories, observations, interviewing, and rating scales etc. If the results are favourable, it is taken for granted that the prescriptions were correct. In case the results are contrary, necessary changes are made in the

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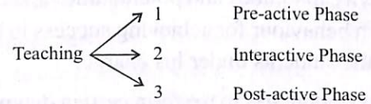
teaching learning process to get the desired results. Evaluation serves as a feedback. Teaching strategies are planned in the light of the feedback obtained from evaluation.

2.4.2 Phases of Teaching

Teaching is a complex task. For performing this task, a systematic planning is needed. Teaching is to be considered in terms of various steps and the different steps constituting the process are called the phases of teaching. Jackson thinks that if we are to obtain a complete description of the teaching activity, we must consider what the teacher does before and after his regular teaching in the class. Jackson divides the teaching act into three phases of teaching as shown below:



Teaching process also can be explained as under:



(1) ***Pre-active stage:*** Before actual classroom teaching or what Jackson calls 'calm' part of teaching, a teacher has to perform many tasks. These tasks include preparing lesson plans, arranging furniture and equipment within the classroom, manning papers, studying test reports, reading sections of a textbook and thinking about the aberrant behaviour of a particular student. These activities are very crucial to the teacher's performance during regular teaching session.

Pre-active behaviour is, more or less deliberative. The teacher at this stage hypothesises about the possible outcome of her/his action. As the teacher decides what textbooks to use or how to group the children for reading or whether to notify students' parents of their poor performance, her/his behaviour is at least analyzable.

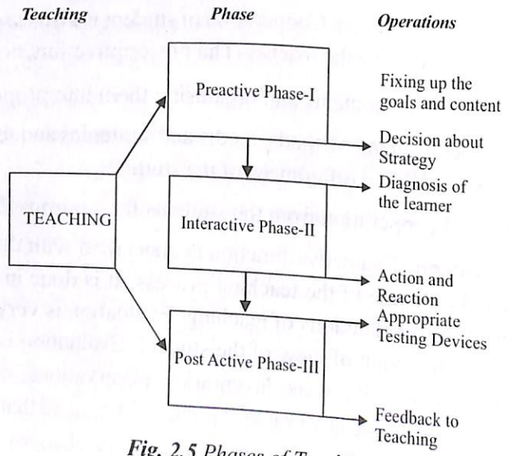


Fig. 2.5 Phases of Teaching

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Following operations or sub-stages are involved in pre-active stage of teaching:

1. Forming or fixing up goals.
2. Taking decisions about the content.
3. Managing or sequencing appropriate means and ways of presentation.
4. Deciding about appropriate strategies and tactics of teaching.
5. Developing teaching strategies for the specific subject matter.

(ii) Interactive stage: This is actual classroom teaching. At this stage, the teacher uses a number of strategies for achieving the goals already set. In the interactive setting, the behaviour of the teacher is more or less spontaneous. Research suggests that things happen quickly during the teaching session. For example, the elementary teacher may change the focus of his concern as many as 1,000 times daily. Amid all this hustle and bustle the teacher often has little time to think.

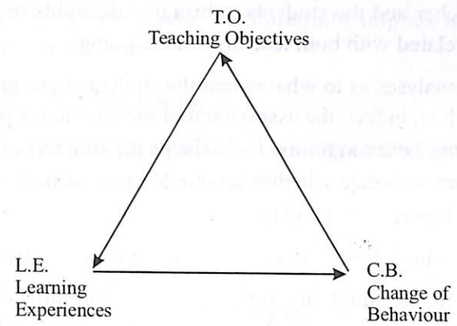


Fig. 2.6 Teaching Operations at Pre-active Stage

Many teachers try to devote sometime alone with individual students but the teacher-student dialogue is usually public rather than private. When a teacher is alone with a student, he is not faced with the problem of control and management that frequently absorbs a major portion of his energies in a group setting. There is a greater sense of physical and psychological intimacy between the teacher and the student during individual sessions than when the teacher is responding to the class as a group.

The task of keeping pupils involved may entail explanation, demonstration, definition, and other logical operations that have come to be thought of as the heart of teaching.

The interactive stage of teaching involves the following operations:

(i) Perceiving the size of the class by the teacher to identify students.

(ii) Diagnosing the achievements of the learners.

(iii) Action or achievement (initiation or response). This involves the following operations: In the above paradigm:

- (a) Selection of stimuli
- (b) Presentation of the stimuli
- (c) Feedback of reinforcement
- (d) Development of strategies of teaching

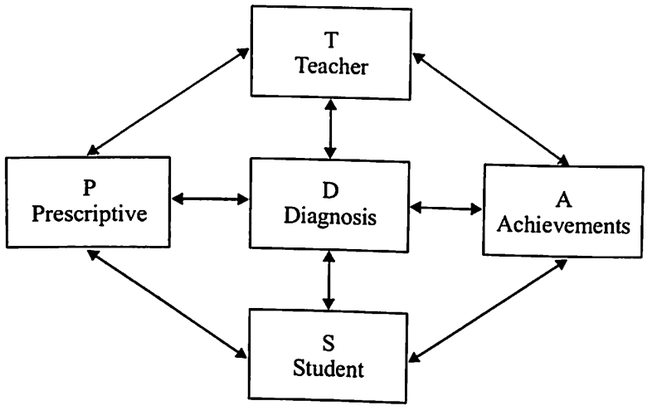


Fig. 2.7 Teaching operations at Interactive Stage

(iii) Postactive stage: The post-active stage concerning evaluation provides necessary feedback to the teacher and the students in bringing desirable improvement in their performance. It is related with both teaching and learning.

The teacher analyses as to what extent the students have grasped the material presented to them. It is, in fact, the assessment of the interactive process. It helps the teacher to teach things better in future. It also helps the students to learn things better. It enables the teacher to decide whether he should proceed with the new contents or re-teach what has already been taught.

In short, following operations are involved at the post-active stage of teaching:

1. Assessing the suitability of the objectives determined.
2. Deciding regarding re-teaching the content or further taking up the content.
3. Assessing the suitability of the instructional material and aids.
4. Assessing the impact of the classroom environment and effecting desired changes.

It may be stressed that all the above mentioned three phases of teaching are closely inter-related. All those stages may be depicted by the following paradigm.

Pre-Active	Inter-Active		Post Active
Fixation of Goal Determination of Content	Linguistic Pt → Dt → Rt	$P_p \rightarrow D_p \rightarrow R_p$	
	Performative Pt → Dt → Rt	$P_p \rightarrow D_p \rightarrow R_p$	→ Feed Back
	Expressive Pt → Dt → Rt	$P_p \rightarrow D_p \rightarrow R_p$	

→ Behavioural Changes or Achievement

Fig. 2.8 Three Stages in Pardigm for Teaching Act

Three stages in paradigm for teaching act

1. *Pt* stands of the teacher's perception of the pupil's behaviour.
2. *Dt* is the teacher's diagnosis of the pupil's state of interest, readiness, knowledge etc., made by inference from the behaviour of the pupil.
3. *Rt* is the action taken by the teacher in the light of his diagnosis.
4. *Pp* is the pupil's perception of the teacher's behaviour.
5. *Dp* is the pupil's diagnosis of teacher's state of interest what he is saying and is inferred from the teacher's behaviour.
6. *Rp* is the reaction of the pupil to the action of the teacher. Each unit marked off by the double vertical line is an example of a teaching unit.

Each unit consists of a teacher-pupil inter-action. There are two sub-units within the teaching cycle which are divided by single vertical line.

The sub-units *(Pt →Dt →Rt)* is referred to as an act of teaching.

The sub-unit $(P_p \rightarrow D_p \rightarrow R_p)$ is what we call the act of learning or taking instruction.

The act of teaching and the act of taking instruction are reciprocating acts and when performed under appropriate conditions they result in behavioural changes or achievement. Teaching according to this paradigm implies that someone gives instruction and someone takes it.

Analytical description of teaching

An analysis is concerned with the process of breaking or separating out the elements or constituents of a substance or an idea. Therefore, an analytical description of teaching would demand the breaking or separating the different components or elements of the process of teaching. Gage (1968) analyses teaching in terms of technical skills. According to him, 'Technical skills are specific instructional techniques and procedures that a teacher may use in the classroom. They represent an analysis of the teaching process into relatively discrete components that can be used in different combinations in the continuous flow of the teacher's performance.'

N.K. Jangira and Ajit Singh (1982) state, 'Teaching can be analysed in terms of teacher behaviour at least at three levels viz. component teaching skills, component teaching behaviours comprising skill and atomistic teaching behaviours.'

Thus, an analytical description of teaching will relate to the following activities:

(i) Activities undertaken in the teaching process.

(ii) Teaching objectives to be achieved through these activities.

Some of the attempts made in the analytical description of teaching are given here in brief.

Komisar (1906): Komisar has analysed teaching into various specific activities: introduction, demonstrating, contrasting, explaining, proving, justifying, defining, rating, appraising, ampli-fying, vindicating, interpreting, questioning, elaborating, identify-ing, designing, conjecturing, confirming etc.

B.K. Passi (1976) has concluded that teaching constitutes a number of verbal and non-verbal teaching acts like questioning, accepting pupil response, smiling, rewarding and nodding to pupil response, movements in the class, gestures, etc.

Check Your Progress

10. What are the three R s of teaching and seven R s of education?
11. What are the phases of teaching?
12. What is analytical description of teaching?

NOTES

2.5 LEVELS AND OPERATIONS OF TEACHING-LEARNING

Classical conditioning as suggested by Pavlov and Watson involves repetition and consistency which may be utilised for learning emotional reactions to previously neutral stimuli. For instance, if a child develops hatred for a school subject due to severe reprimands, the student be provided emotional experiences which are positive and in conjunction with school related work by the teacher.

The theory of contiguity association developed by Guthrie, which has contiguity of the elements of 'S' and H' may be utilized for learning rote responses to simple questions. The teacher should present stimulus for obtaining quick accurate responses. For example, a child learns to speak 'rose' if a rose flower is presented to him.,

The theory of reinforcement advocated by Thorndike and Skinner, involves the linkage of 'S' and 'R' when 'R' is followed by reinforcement and may be utilized for moulding the behaviour of the child by modifying existing patterns and more firmly establish-ing existing behaviours. Any rewarding situation, a word of praise or a pat on the back may improve the reading ability or the handwriting of a student. The teacher's ingenuity lies in selecting suitable reinforcements. The teacher is expected to analyse desirable behaviours and provide reinforcement as soon as he feels that the desirable behaviour has approximated.

Piaget's theory of concept learning aims at building up understanding of common characteristics of making a class. The teacher may assist the child in structuring and organising basic experiences into systems by the process of verbalisation or through frequent exercises.

Theory of imitation developed by Bandura implies that learning new behaviour by observing a model may be used in the learning of skills, attitudes, social and moral behaviours. Teacher's own behaviour may act as model for children. Demonstration methods may be effective in handling scientific instruments.

Dewey's problem solving theories aim at utilising principles to reach goals, otherwise blocked. Teacher encourages free thinking and allows flexibility in thinking.

A close study of the various theories of learning brings out the following principles of learning round which teaching should centre:

1. There are individual differences in learning activities.
2. Meaningful practice is essential in building cognitive structures.
3. Learning is a development process
4. Learning becomes more effective under satisfying conditions
5. Goal setting facilitates learning
6. Transfer takes place in learning situations
7. Motivated forgetting helps in breaking away incorrect S.R. bonds
8. Greater intelligence leads to better and complex learning
9. Understanding is dependent upon habits and meaningful structures

Learning conditions and teaching methods may be used synony-mously. It must be realized that learning theories and principles go hand in hand.

Teaching and learning at memory level

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In memory level presentation, drills and exercises occupy a very important role for promotion of learning. Stress is laid on the presentation of information and facts in a very systematic manner with a view to develop memory. Recall and recognition become very prominent. Students mug up the essential contents of the subject-matter and reproduce them. The learner is reduced, by and large, to a passive role. The mind of the learner is considered as a container of information. Following are the important features associated with learning at memory level:

1. Analysis of the subject-matter
2. Definite and fixed order of the subject-matter
3. Rigid adherence to the presentation of the subject-matter
4. Mechanical handling of the various segments of the contents

Classroom implications of teaching at memory level

1. *Subject-matter as the focus:* In such a presentation it is the subject-matter which gets the focus of attention and not the experience of the learner.
2. *Learning is short-lived:* Memory learning does not make an impact on the personality of the learner. Learning outcome is very short-lived.
3. *Great strain on the learner.* Such type of learning puts a great strain .on the mind of the learner and hinders the proper development of learning with regard to particular subject.
4. *Motivation:* The teacher must remain constantly on toes to attract the attention of the learner.
5. *Testing:* Essay type as well as objective type questions form the basis of testing. Questions are framed in such a way as to measure the process of recall and recognition.
6. *Interaction:* The interaction between the teacher and the student is at the lowest level.
7. *Superficial knowledge:* The learner may not develop a commendable control over the subject still he may reproduce facts and figures.

Use of memory level teaching: It would be wrong to assume that memory level presentation is hundred per cent vicious. The teacher can derive useful information from this and place emphasis on practice. It may be remembered that for certain disciplines and knowledges, teaching at memory level is a necessity. The teacher should link old knowledge with the new one so that the old knowledge is utilized and remains in the memory for a longer period.

Teaching-learning at understanding level

The dictionary meaning of understanding is to perceive the meaning of, to grasp the idea of or to comprehend. Understanding occurs when we come to see how to use produc-tively, in ways which we care about, pattern of general ideas and supporting facts. The key figures in developing teaching and learning at understanding level are Herbart, Judd, Morrison and J.S. Bruner.

NOTES

Herbart mentions three forms of mental reality which play an important role in teaching learning at the understanding level. They are sense impressions, images and affective elements of pleasure and pain. In Herbart's arrangement, the teacher is conceived as an architect and the builder of the minds of the students by manipulating ideas to construct student's circle of thought. He advocated five steps of teaching: preparation, presentation, comparison, generalisation and application. In step 5 (application) students are expected to demonstrate their understanding by applying it to a novel situation.

Morrison very clearly stated that understanding is not simply being able to recall something; it is not only a generalisation deducted from specific facts but insight into how it may be used in future situations. Morrison asserted that the outcome of all teaching is 'Mastery' and not memorisation of facts. He proposed a unit plan, each unit representing an insight which is relatively complete in self.

J.S. Bruner assigns a functional approach to the problem of teaching at the understanding level. He observes that human beings possess tremendous capacity to discriminate objects or processes in their environment. An individual can make common sense out of his environment by enabling'himself to select from an almost infinite number of discriminate objects and events, those which appear to have something in common.

Classroom. implications of teaching at the understanding level. To make teaching-learning meaningful at the understanding level, the teacher must keep in view the following points:

1. Objectives must be kept very clear
2. Proper role of practice must be understood
3. Productive motivational techniques should be avoided
4. Lesson plans should be used properly
5. Students and lesson must be paced advantageously
6. The significance of spiral curriculum should be recognised
7. Programmed learning and machine teaching should be given a fair trial for teaching at the understanding level

Teaching-learning at reflective level

Big places teaching-learning levels on a continuum which ranges from 'thoughtless' to 'thoughtful' modes of operation. Memory level is the most 'thoughless' and the reflective level the most 'thoughtful'.

The learner gains little insight at the memory level. At the understanding level, the learner gains insights and at the reflective level, the the learner can further achieve insights independently. At the reflective level the learner can reconstruct the learnt material into classes and systems. The chief characteristics of the reflective level are the learnings associated with understanding level plus the sense of purpose and goal. The reflective level is in conformity with democratic-non-authoritarian teacher-student relationships.

NOTES

Every educational system cherishes this most coveted goal of teaching for promoting reflection. Reflective level teaching is a kind of problem-centred teaching. Two essential features of teaching at reflective level are:

1. Problem raising
2. Problem solving

According to Biggs, reflective level teaching should result in students emerging with an enlarged store of tested insights of a generalised character and an enhanced ability to develop and solve problems. These two are essential ingredients in any reflective level teaching.

Reflective teaching resembles with that of the scientific method and same steps are followed. The spirit behind is that of an objective equity.

In reflective level teaching classroom presentation is almost open-ended and a free discussion between the teacher and the students takes place. Some of the characteristic features of a procedure followed by a teacher teaching at reflective levels are:

1. Discussion
2. Critical reacting
3. Dispassionate probe into the truth of the matter

There is a genuine concern for getting doubts removed and for deeper intellectual curiosity. The classroom atmosphere is of teacher-learner mutual enquiry wherein genuine problems are posed and solved.

Motivation in teaching at reflective level: At the reflective level teaching, the motivation is relatively intrinsic and arises from the fact that both students and the teacher are thoroughly involved in the situation. They are interested not only in framing appropri-ate questions but also in formulating suitable solutions and getting answers to them.

Role of the teaching: It would be wrong to assume that the role of a teacher is that of a 'soft hearted baby sitter'. Very frequently the teacher has to be tough minded. He must persistently ensure that the students sift all pertinent avail-able evidence.

Subject-matter best amenable to reflective teaching: Bigge in this connection has observed, "The problem-centred teaching seems to spring into existence in those situations where minds of teacher and students are engaged. It grows more from a unique relationship between the teacher and students than from any different nature of formal course materials."

Assumption. Bigge points out, 'True problem centred teaching like any teaching which leads to understanding is necessarily unhurried procedure. Consequently it is very difficult and usually impossible to pursue problem centred teaching in situations characterised by rigid scheduling of time for units to be covered. To make problem-solving teaching a success, a teacher may need to make several false starts; when one plan for bringing students to feel a problem fails, he tries another until he hits on one that works. The period during which given problem is studied is necessarily rather unstructured and frequently it is impossible to predict how soon a class will device

anything resembling an answer. Even though a problem has been under study for a week or more and anything educational seems to have happened so long as the teacher feels there is still a chance that some useful insight will emerge, study should be continued.'

Classroom implications at the reflective level of teaching

1. Classroom atmosphere is free, frank and that of mutual enquiry
2. Teaching resembles the method of scientific enquiry
3. Advisable to permit students to make mistakes
4. Atmosphere of the class should be permissive and not restrictive
5. Teacher should promote open-mindedness which helps in building suitable class environment for reflective teaching
6. Democratic leadership should be provided by the teacher for promoting reflective level teaching
7. Teacher should encourage voluntary participation by students as this is a good class climate for reflective level teaching

Meaning and significance of mastery learning (ML)

Mastery learning is defined as a teaching learning approach which asserts that under appropriate instructional conditions, all students can and almost will learn most of what is taught in schools. The ML starts with the assumption that almost all students can and will master a great deal of what is taught, if instruction is approached systematically; if the students are helped when and where they have learning difficulties; if they are given sufficient time to achieve mastery, and if there is some clearcut criteria of what constitutes mastery.

According to B.S. Bloom (1968), most students can master what teachers teach them. The instructional variables can be easily manipulated so that almost all students achieve the prescribed degree of mastery.

Studies by J.H. Block (1971, 1974) indicate that in many subject areas, all students can achieve some defined level of mastery. It has been found that even gifted students need individual methods of study suited to their personality, rather than the conventional stereotyped techniques of teaching.

T.R. Guskey (1980, 1987, 1988) concluded (through the synthesis of researches on mastery learning) that mastery approach has allowed many teachers to dramatically increase the number of students in their classrooms who learn, and learn very well what they as teachers have set out to teach. Therefore, if systematically practised, mastery learning strategy could be of immense help to the teachers and administrator in arresting the rising rate of dropouts by raising achievement, self-concept and attitude towards schooling of the learners.

Mastery learning strategy (MLS): MLS was first used by J.F.S. Keller (1968). Since then it has become popular in several advanced countries. It is estimated that half of the total courses in the USA are based on the mastery learning concept and such courses are offered in the form of learning packs using individualized instruction.

The studies conducted in India by Das Gupta (1977, 1980), Mathur (1977, 1980, 1981) and Kishore (1981, 1982) and others have proved that from the points of view of consolidation, achievement, recall and favourable student response, the mastery learning model based on the individualized system of instruction has shown promise.

Through this strategy, the student is motivated to interact at his own pace with a given learning segment. He consolidates his learning by getting his difficulties removed individually by taking individual guidance from his instructor and the fast-pacers.

With a view to motivative the student to learn, the course material is broken into small segments and each segment has an interesting introduction, a list of behavioural objectives, a suggested procedure for learning and a set of self-assessment exercises.

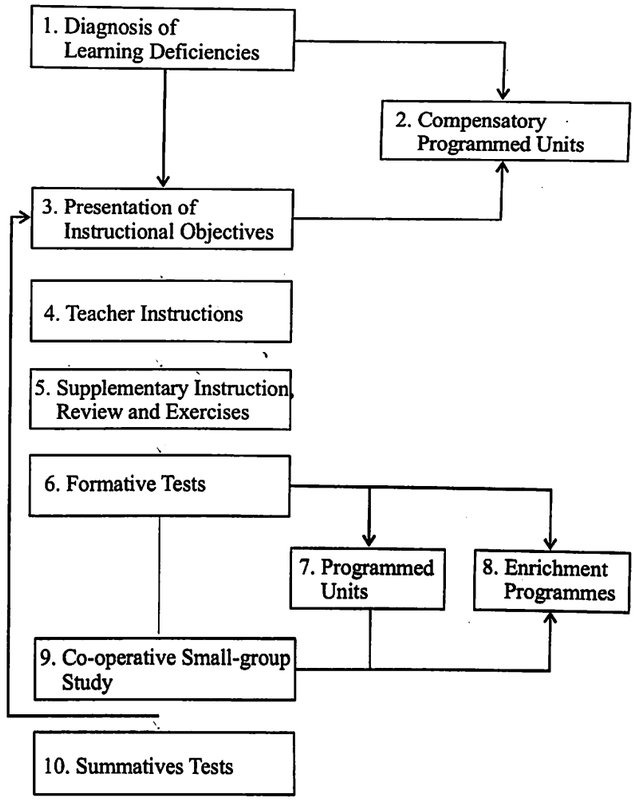


Fig. 2.9 Major principles of instruction for mastery learning

In this learning strategy, the student is allowed to proceed on to the next learning segment when he passes a criterion test. The criterion test is to be passed by the student with a minimum cut-off score of more than 80% marks indicating the mastery of his on-going learning segment.

If a student is unable to pass the criterion test, he is given individual guidance by the instructor and peer-tutors. The student repeats the learning segment and takes retests until he passes the criterion test.

The mastery learning model places focus on the following aspects:

1. ***Behavioural objectives:*** The specific objectives for learning a study unit are made clear to the learner, so that he knows what is expected of him from the course of study.
2. ***Small learning segments:*** The subject matter of a study unit is broken into several blocks each followed by self-assessment questions which work as learner's own evaluation checks.
3. ***Self-pacing:*** The learner learns the study unit at his own speed. The time for learning a study unit is different for different learners while the degree of mastery is the same.
4. ***Individual attention:*** As and when a student is unable to understand a portion of the study unit, he takes the individual help from a fast-pacer or instructor.
5. ***Criterion-referenced testing:*** A minimum level of performance is specified which indicates the mastery of the study unit and readiness for learning new material.

Criterion-referenced testing

In recent years, with mastery learning models gaining wide currency, there has been a renewed interest in the concept of criterion-referenced tests (Glaser, 1971; Mayo, 1970; Popham and Husek, 1969). Such tests yield measures directly interpretable in terms of specified performance standards. The data from criterion-referenced test is also useful in evaluating the instructional procedure.

Criterion-referenced test determines the degree of the mastery of the study unit. It is used primarily to determine whether or not the learner is ready to advance to another study unit.

The criterion-reference test has yet another advantage that of diagnosing the specific difficulties of learners and prescribing cer-tain remedial treatments. Also, concern for criterion- referenced testing has gained importance with the emphasis on behavioural objectives (Bloom, 1964) while structuring and individualizing instructions. Therefore, mastery or lack of it in individualized instruction implies whether or not a learner has achieved the objectives of the instructions.

The criterion-referenced tests are used primarily in the courses based upon the mastery learning concept. A student pursuing such a course is asked to consolidate a given subject matter at his own pace of learning assisted by an instructor. The relationship between the criterion-referenced test and mastery learning procedure is shown below:

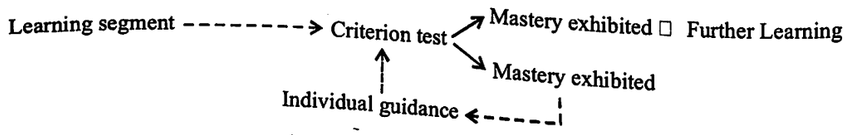


Fig. 2.10 Relationship between Mastery Learning and Criterion Testing

Check Your Progress

13. What are the principles of learning?
14. What is the reflective level of teaching?
15. Define mastery learning.
16. What is criterion-reference testing?

2.6 SUMMARY

In this unit, you have learnt that:

- The word education has a very wide connotation. Philosophers and thinkers from Socrates (469-399 B.C.) to Dewey (1859-1952) in the West and Yajnavalkya (About 600 B.C.) to Gandhi (1869-1948) in the East have defined education in accordance with their philosophy of life with the result that there emerged divergent concepts and definitions of education.
- According to the psychological aspect of the process, the educator must understand the nature, interests, capacities and limitations of the child.
- The word 'self-realisation' implies development of individuality in the child.
- Mental development or intellectual development is the development of the mental abilities and capacities which help an individual to adjust his behaviour to the ever changing environmental conditions or to enable him to accomplish a task that needs complex cognitive abilities.
- A child has a good memory in the earlier stages but this memory is generally a rote memory.
- The process of maturity continues throughout all stages of development.
- Mental development is influenced by both heredity and environment.
- The cultural and social experiences, learning opportunities and discipline which he gets for the development process, contribute significantly towards his mental development.
- Piaget is regarded as one of the pioneers in psychological investigation of children although he neither undertook formal study nor passed any examination in psychology.
- According to Piaget, a child goes through a series of developmental stages which are as follows:
  - o Sensori-Motor Stage (Birth to 2 years)
  - o Preconceptual Stage (2 to 4 years)
  - o Intuitive Stage (4 to 7 years)
  - o Concrete Operation Stage (7 to 11 years)
  - o Former Operations Stage (11 to adolescence)
- Piaget called 'schemes' as cognitive structures or the patterns of behaviour that children and adults use in dealing with objects in their environment. These patterns can be simple as well as complex.
- A baby assimilates when he understands and perceives the new in the light of his old perceptions. A baby forms a new scheme 'modifies or changes his old perception to suit the new.
- According to Piaget, learning includes the wide range of activities. Rigid distinctions like classroom for instruction, laboratory for practicals, recess for amusement, mathematics for developing computational ability, and athletics for strengthening the body muscles are unnecessary.

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- According to Piaget, a learner desires to reduce his internal conflicts by keeping his thoughts harmonious and in equilibrium.
- Memory is a symbolic representation of how the child has schematised what he saw.
- Variety of cognitive activities like story-telling, rhymes, and singing are included in the programme in a systematic manner. There is a deliberate attention of developing cognitive growth.
- The teacher should try to assess the level and type of thinking of each child in his class.
- There is a close relationship between the physical and emotional factors. An imbalance or disturbance in the child's physical growth is most likely to be reflected in his intellectual functioning and personality adjustment.
- Emotions may be external or physiological and internal or psychological.
- Some of the more common symptoms of unsatisfactory emotional adjustment are resistance to learning, speech problems, excessive day dreaming, oversensitivity, extreme dependence on peers or adults, and resistance to the requirements of the classroom or the group and temper tantrums.
- Physical growth and development refers to a process which brings about bodily and physiological changes—internal as well as external—in an organism from the conception till his death.
- Motor abilities involve bodily movements of various organs and co-ordinated functions of nerves and muscles. Skill in motor activity depends on not so much on gross body movements but fine coordination of the smaller muscles.
- Teaching—learning has four aspects: teacher, student, learning process and learning situation.
- Teaching-learning process is a means whereby society trains its young ones in a selected environment (usually the school) as quickly as possible to adjust themselves to the world in which they live.
- Modern teaching-learning process assigns an important place to student—activity. It calls for a child-centred approach.
- Interaction between the teacher and the learners is the core of the teaching learning process.
- Teaching remains central to both learning and evaluation. There is an inter-relationship between teaching objectives (ends), learning experiences (means) and evaluation (evidence of what is taught and learnt).
- Learning is what students do, teaching is what the academic staff does and that improvement in teaching can only be demonstrated if there is consequential improvement in learning.
- Although students learn because of the instruction they receive, they also learn in spite of the instruction they receive. In the process of accommodating to what is being taught students attempt to 'fit' the new experience into their past experience—into the knowledge, insights and understandings that they have accumulated previously.

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- Teaching is an important part of the process of education. Its special function is to impart knowledge, develop understanding and skill.
- Teaching is a relationship which is established among three focal points in education—the teacher the student and the subject matter.
- Teaching is to be considered in terms of various steps and the different steps constituting the process are called the phases of teaching.
- An analysis is concerned with the process of breaking or separating out the elements or constituents of a substance or an idea. Therefore, an analytical description of teaching would demand the breaking or separating the different components or elements of the process of teaching.
- Classical conditioning as suggested by Pavlov and Watson involves repetition and consistency which may be utilised for learning emotional reactions to previously neutral stimuli.
- Piaget's theory of concept learning aims at building up under-standing of common characteristics of making a class.
- In memory level presentation, drills and exercises occupy a very important role for promotion of learning.
- The teacher should link old knowledge with the new one so that the old knowledge is utilized and remains in the memory for a longer period.
- Big places teaching-learning levels on a continuum which ranges from 'thoughtless' to 'thoughtful' modes of operation. Memory level is the most 'thoughless' and the reflective level the most 'thoughtful'.
- According to Biggs, reflective level teaching should result in students emerging with an enlarged store of tested insights of a generalised character and an enhanced ability to develop and solve problems.
- According to B.S. Bloom (1968), most students can master what teachers teach them. The instructional variables can be easily manipulated so that almost all students achieve the prescribed degree of mastery.
- Mastery learning strategy was first used by JF.S. Keller (1968).
- With a view to motivative the student to learn, the course material is broken into small segments and each segment has an interesting introduction, a list of behavioural objectives, a suggested procedure for learning and a set of self-assessment exercises.
- In this learning strategy, the student *is* allowed to proceed on to the next learning segment when he passes a criterion test.
- n recent years, with mastery learning models gaining wide currency, there has been a renewed interest in the concept of criterion-referenced tests.
- The criterion-reference test has yet another advantage that of diagnosing the specific difficulties of learners and prescribing certain remedial treatments. Also, concern for criterion- referenced testing has gained importance with the emphasis on behavioural objectives (Bloom, 1964) while structuring and individualizing instructions.

2.7 KEY TERMS

- **Intellectual training:** It refers to mental exercise or training.
- **Sublimation:** It also means redirection but in this case emotion gets elevated and changes its form into something nobler and higher.
- **Reflective level of learning:** It is the level at which the learner can reconstruct the learnt material into classes and systems.
- **Mastery learning:** It is a teaching learning approach which asserts that under appropriate instructional conditions all students can and almost will learn most of what is taught in schools.

2.8 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Education is regarded as a tripolar process as it involves interaction of the personality of the educator on that of the educand in a social setting which affects the modification of the behaviour of the educand.
2. According to Gandhi, education is an all-round drawing of the best in the child and man — body, mind and spirit. Education is a pouring out and not a pouring in process.
3. Jean Piaget was the first to develop the theory of cognitive development.
4. According to Crow and Crow (1973), an emotion is an effective experience that accompanies generalised inner adjustment and mental and psychological stirred up states in the individual, and that shows itself in his own behaviour.
5. Physical growth and development refers to a process which brings about bodily and physiological changes—internal as well as external—in an organism from the conception till his death.
6. Motor development may be defined as the development of strength, speed and accuracy in the use of muscular parts of the body such as arms, eyes, legs and neck muscles.
7. Teaching-learning process is a means through which the teacher, the learner, the curriculum and other variables are organised in a systematic manner to attain pre-determined goals and objectives.
8. The important aspects of teaching-learning process are:
   (i) Command, planning and organisation of the subject matter or content and activities.
   (ii) Class control and discipline
   (iii) Psychology of learners
   (iv) Evaluation
9. The objectives of teaching manifest themselves through:
   (i) The knowledge children acquire.
   (ii) The skills and abilities children attain.
   (iii) The interest children develop.
   (iv) The attitudes children manifest.

10. The three 'R's of teaching are reading, writing and arithmetic. For education rights, responsibilities, relationships and recreation are added, which makes, it seven 'R's.
11. The phases of teaching involve pre-active stage, interactive stage and post-active stage.
12. An analysis is concerned with the process of breaking or separating out the elements or constituents of a substance or an idea. Therefore, an analytical description of teaching would demand the breaking or separating the different components or elements of the process of teaching.
13. The principles of learning a round which teaching should centre are:
    1. There are individual differences in learning activities.
    2. Meaningful practice is essential in building cognitive structures.
    3. Learning is a development process.
    4. Learning becomes more effective under satisfying conditions.
    5. Goal setting facilitates learning.
    6. Transfer takes place in learning situations.
    7. Motivated forgetting helps in breaking away incorrect S.R. bonds.
    8. Greater intelligence leads to better and complex learning.
    9. Understanding is dependent upon habits and meaningful structures.
14. Reflective level teaching is a kind of problem-centred teaching. Two essential features of teaching at reflective level are: (i) Problem raising (ii) Problem solving.
15. Mastery learning is defined as a teaching learning approach which asserts that under appropriate instructional conditions, all students can and almost will learn most of what is taught in schools.
16. Criterion-referenced test determines the degree of the mastery of the study unit. It is used primarily to determine whether or not the learner is ready to advance to another study unit.

2.9 QUESTIONS AND EXERCISES

Short-Answer Questions

1. Education is a pouring out and not a pouring in process. Briefly explain.
2. What are the aspects of mental development?
3. What are the factors affecting the motor and physical development of a child?
4. State the nature of teaching-learning process.
5. What are the three variables in the structure of teaching?

Long-Answer Questions

1. Discuss the cognitive approach to education. Give your view on Piaget's theory.
2. Explain the importance of psychomotor approach in a child's education.

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3. Explain why teaching learning is a three-way communication?
4. Discuss the phases of teaching.
5. Discuss are the levels of operations of the teaching-learning process.

2.10 FURTHER READING

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UNIT 3 MODELS OF TEACHING

Structure

3.0 Introduction
3.1 Unit Objectives
3.2 Definitions of Teaching Model
3.3 Nature of Teaching Models
  3.3.1 Elements of a Teaching Model
3.4 Information-processing Models
  3.4.1 Models and Theories
3.5 Summary
3.6 Key Terms
3.7 Answers to 'Check Your Progress'
3.8 Questions and Exercises
3.9 Further Reading

3.0 INTRODUCTION

Educationists and psychologists have always strived to improve the teaching techniques. Various models have been developed to provide teachers with a wide range of approaches for creating an environment of interactive learning. An intelligent use of these approaches will allow teachers to understand better the students' learning needs, improvise the different learning styles, and design appropriate curriculum and educational activities. The models of teaching are, in fact, implementation of practical problems and looking for their solutions as student and teachers work together in a classroom. These are scientific and systematic approaches. Some of these models are simple to use but difficult to master while some serve broad purposes and others target particular goals. In this unit, you will learn about the nature and elements of teaching models, and Robert's Glaser's model of teaching and William Glasser's classroom meeting model. You will also learn about the use of information-processing models promoted by cognitive psychologists.

3.1 UNIT OBJECTIVES

After studying this unit, you will be able to:

- Define a teaching model
- Discuss the nature and elements of teaching models
- Describe the information-processing models

3.2 DEFINITIONS OF TEACHING MODEL

Development of models of teaching is one of the recent innovations in teaching. An important purpose of discussing models of teaching is to assist the teacher to have a wide range of approaches for creating a proper interactive environment for learning.

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An intelligent use of these approaches enables the teacher to adapt him to the learning needs of the students.

A number of educationists and psychologists have proposed model- approach to teaching. Flander (1970) put his interaction analysis as a model of teaching and for this approach he categorised the statements of students and teachers into ten categories. Glaser (1962) divided instructional material in his model into four components. These are instructional objectives.

The credit for transforming the prevailing teaching theories into different models of teaching goes to Bruce Joyce and Marsha Weil (1980).

In India, the first national project on models of teaching was planned, designed and executed during 1985-86.

Teaching models have been defined in a number of ways. Some of the important definitions of a teaching model are given here to have a wider perspective of this concept.

Allen and Ryan (1969): Modelling is an individual demonstrating particular pattern which the trainee learns through imitation.

Bandura (1969): Modelling demonstrates that virtually all learn-ing phenomena resulting from direct experiences can occur on a vicarious basis through observation of other person's behaviour and its consequences for them.

B.K. Passi, L.C. Singh and D. N. Sansanwal (1991): A model of teaching consists of guidelines for designing educational activities and environments. Model of teaching is a plan that can also be utilised to shape courses of studies, to design instructional material and to guide instruction.

Joyce and Weil (1972): Teaching models are just instructional designs. They describe the process of specifying and producing environmental situations which cause the student to interact in such a way that specific change occurs in the behaviour. Teaching model is a pattern or plan, which can be used to shape a curriculum or course to select instructional materials and to guide a teacher's actions.

N.K. Jangira and Ajit Singh (1983): A model of teaching is a set of inter-related components arranged in a sequence which provides guidelines to realise a specific goal. It helps in designing instruc-tional activities and environmental facilities, carrying out of these activities and realization of the stipulated objectives.

Paul D. Eggen et al (1979): Models are prescriptive teaching strategies designed to accomplish particular instructional goals.

Weil and Joyce (1978): A model of teaching consists of guidelines for designing educational activities and environments. It specifies ways of teaching and learning that are intended to achieve certain kinds of goals.

Paul D. Eggen and others (1979) explain the meaning of a model in these words, 'An engineer, in considering a project, first identifies the type of structure to be built, e.g., a building, a bridge or a road. Having done this, he selects an appropriate design or blueprint to follow in building that structure. The specifications of the blueprint determine the actions the builder takes and the kind of building that will result. The particular type of blueprint or model chosen depends on the type of structure to be built. In a similar manner a teacher considering the choice of a teaching model first identifies what is to be taught and then selects a model in accordance with that goal. The model chosen is specifically designed to achieve a particular set of objectives and will determine in large part of the actions of the teachers.'

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Educators and psychologists have designed several types of teaching models which provide suitable guidelines to the teachers for modifying the behaviour of the learners. As a matter of fact some sort of models of teaching have been in existence since times immemorial. In simple language a model of teaching may be defined as a blueprint designed in advance for providing necessary structure and direction to the teacher for realizing the stipulated objectives.

3.3 NATURE OF TEACHING MODELS

Some common identifiable characteristics of a good model, are given below:

1. **Specification of learning outcome:** All models of teaching specify what the students should perform after completing an instructional sequence.
2. **Specification of environment:** A teaching model specifies in definite terms the environmental conditions under which a student's response should be observed.
3. **Specification of criterion of performance:** A model of teaching specifies the criterion of performance which is expected from the students.
4. **Specification of operations:** *A* model of teaching specifies the mechanism that provides for the reaction of students and interaction with the environment.
5. **Scientific procedure:** *A* model of teaching is based on a systematic procedure to modify the behaviour of the learner. It is not a haphazard combination of facts.

Functions

1. They help in guiding the teacher to select appropriate teaching techniques, strategies and methods for effective utilisation of the teaching situation and material for realizing the objective.
2. They help in bringing about desirable changes in the behaviour of the learners.
3. They help in finding out ways and means of creating favourable environmental situations for carrying out teaching process.
4. They help in achieving desirable teacher-pupil interaction during teaching.
5. They help in the construction of a curriculum or contents of a course.
6. They help in the proper selection of instructional material for teaching the prepared course or the curriculum.
7. They help in designing appropriate educational activities.
8. They assist producers of materials to create interesting and effective materials and learning sources.

Check Your Progress

1. How has Jangira and Singh defined teaching model?
2. What is Eggen's view on teaching models?

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9. They stimulate the development of new educational innovations.
10. They help in the formation of a theory of teaching.
11. They help to establish teaching and learning relationship empirically.
12. They are useful to develop social efficiency, personal abilities, cognitive abilities and behavioural aspects of the students.

Effects of teaching by modelling

Bandura and Walters mention three kinds of effects in teaching by modelling. These are: (i) a modelling effect (ii) an inhibitary and disinhibitary effect and (iii) An eliciting effect.

1. **A modelling effect:** A modelling effect can be seen when a teacher demonstrates to a student how to hold a pencil or write Capital A etc., and thus, shows a new behaviour. Here a student learns new kinds of response pattern.
2. **Are inhibitary and disinhibitary effect:** An inhibitary or disinhibitary effect takes place when through modelling we let the student know that it is not possible to look at pictures of nudes, in an art book.
3. **Are eliciting effect:** The eliciting effect takes place when a teacher through modelling tries to teach students to rise when a lady enters the room, and thus, provides a cue eliciting a response neither new nor inhibited.

Modelling and other similar terms: Among those in common use are modelling, imitation, observational learning, identification, copying, vicarious learning, social facilitation, and role playing.

Gagne feels that learning through imitation seems to be more appropriate for tasks which have little cognitive structure.

Miller and Dollar also plead for learning by imitation. There is no doubt that modelling plays an important role in the development of our personality. Imitation contributes immensely to the learning of values, beliefs, attitudes and sentiments.

It is because of this that great stress is laid on the selection of right type of teachers who in turn must be very careful in selection learning experiences in the class.

Three stages of modelling: Three stages in the development of a model are:

(i) Analysis of a particular skill.

(ii) Identification of the key elements in it.

(iii) Exposition of the elements in such a way as to exemplify satisfactorily the skills under consideration.

3.3.1 Elements of a Teaching Model

A teaching model has six fundamental elements: (i) focus (ii) syntax (iii) principles of reactions (iv) the social system (v) the support system (vi) application context.

Focus: Focus is the central aspect of a teaching model. Objectives of teaching and aspects of the environment generally constitute the focus of the model.

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Syntax: Syntax includes the sequence of steps involved in the organisation of the complete programme of teaching.

Principles of reactions: This element is concerned with the way a teacher should regard and respond to the activities of the students. These responses should be appropriate and selective.

Social system: It is related to the description of the following: (i) interactive roles and relationships between the teacher and the students, (ii) the kinds of norms that are observed and student behaviour which is rewarded.

Support system: The support system relates to the additional requirements other than the usual human skills or capacities of the teacher and the facilities usually available in the ordinary classroom. These requirements refer to special skills, special knowledge of the teachers and special audio- visual material like films, self-instructional material and visit to special places.

Application context: Several types of teaching models are available. Each model attempts to describe the feasibility of its use in varying contexts—goal achievements—cognitive, conative and effective.

Sources of models of teaching

Four important sources from which all the models of teaching have been derived are given below:

1. ***Social interaction sources:*** The model of teaching of this category emphasises the importance of social relationship of he person and are based on the assumption that social relation is the vehicle of education.
2. ***Information processing sources:*** The other source of a model of teaching is the information processing capability of the learner which means the way in which people handle stimuli, organise data, sense problems and solve them. The model of this category emphasises the use of specific strategies within academic disciplines which lead to the development of creativity and general intellectual ability of learners.
3. ***Personal sources:*** Personal and emotional life of the individual and their internal organisation as it affects relationship with this environment are the sources of this category of models.
4. ***Behaviour modification as a source:*** The operant conditioning theory built by B.F. Skinner is the origin of this type of model which is purely a psychological model and is used in most of the teaching strategies developed in the last two decades.

Assumption

1. Each model is based on the assumption that teaching is the creation of appropriate environment and various components of the environment are interdependent.
2. Environment system consists of the content, skill, social relationships, instructional roles, activities and physical facilities. All these elements interact.

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3. Various combinations of the different elements of the environment create different types of environments, and elicit different outcomes.
4. Models of teaching create environment.

Five-fold classification

Some educators classify the teaching models as under:

1. ***Historical teaching models***
   - (i) Socratic teaching model—Socrates
   - (ii) Classical humanistic model— Brody
   - (iii) Personal Development model—Carl Rogers
2. ***Philosophical models of teaching***
   - (i) Impression model—John Locke
   - (ii) Insight model—Plato
   - (iii) Role model—Kant
3. ***Psychological models of teaching***
   - (i) Basic teaching model—Robert Glaser
   - (ii) Computer based teaching model—Lawrence Stolyrow and Davis
   - (iii) Interaction model of teaching—Ned A. Flander
   - (iv) Teaching model of school learning—John Carroll
4. ***Teaching model for Teacher Education.***
   - (i) Toba's model of teaching
   - (ii) Turner's model of teaching
   - (iii) Model of variation in teacher orientation
   - (iv) Life-Long Teacher Education Programme (LLTEP) Model
5. ***Modern teaching models***
   - (i) Behaviour modification models.
   - (ii) Information processing models.
   - (iii) Personal models.
   - (iv) Social interaction models.

Types of modern teaching models

Bruce Joyce and Marsha Weil (1985) organise these models into the following four families on the basis of their chief emphasis—the way they approach educational goals and means.

Types (Families) of Models

Behaviour Modification Models	Information Processing Models	Personal Models	Social Interaction Models

Behaviour modification models stress on changing the external behaviour of the learners and describe them in terms of visible behaviour rather than underlying behaviour. Skinner is the chief exponent of this model. (Table 3.1).

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Table 3.1 *Behavioural Modification Models*

	Model	Chief Exponents	Goals or Missions for which most Applicable
1.	Anxiety reduction	Rinn, Wolpe	Substitution of relaxation for anxiety in social situation
2.	Assertive training	Wolpe, Lazarus, Salter	Direct, spontaneous expression of feelings in social situations.
3	Direct training	Lumsolaine	Pattern of behaviour, skills
4	Managing behaviour	B.F. Skinner	Social behaviour, skills
5	Programmed	B.F. Skinner	Facts, Concepts, skills
6	Relaxation	Rinn, Wolpe	Reduction of stress
7	Self-control	B.F. Skinner	Social behaviour, skills

Information processing models refer to the way people handle stimuli from the environment, organise data, sense problems, generate concepts and solution to problems and use verbal and non-verbal symbols. Models of this type are concerned with the intellectual growth rather than the emotional or social development (Table 3.2).

Table 3.2 *Information Processing Models*

	Model	Chief Exponents	Goals or Missions fo r which Applicable
1.	Advanced organiser model	David Ausubel	Designed to increase efficiency of information processing capacities to absorb related body of knowledge.
2.	Cognitive growth	Jean Piaget, Irving Sigel, Edmund Sullivan	Designed to increase general intellectual development especially logical reasoning, but can also be applied to social and moral development.
3.	Concept attainment	Jeromer Bruner	Designed primarily to develop inductive, reasoning but also for concept development analysis
4.	Inductive thinking Inquiry	Hilda Taba, Richard, Suchman	Designed primarily for development of inductive mental processes and academic reasoning
5.	Memory	Jerry Lucas	Designed to increase capacity of memorisation
6.	Scientific inquiry	Joseph J. Schwab	Designed to teach the research system of a discipline but also expected to affect other domains

Personal development models assist the individual in the development of selfhood. Frequently, they focus on the emotional life of an individual. (Table 3.3)

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Table 3.3 Personal Models

	Model	Chief Exponent	Goals or Mission for which Most Applicable
1..	Awareness training	Fritz Perls, William Schulz	Designed to increase one's capacity for self-exploration and self-awareness.
2.	Classroom meeting (social problem solving)	William Glaser	Designed to develop self-understanding and responsibility to oneself arid one's social group.
3.	Conceptual systems	David Hunt	Designed to increase personal complexity and flexibility.
4.	Non-directive Teaching	Carl Rogers	Designed to lay emphasis on building the capacity for personal development in terms of self awareness, understanding, autonomy and self-concept.
5.	Synetics	William Gordon	Designed for the personal development of Creativity and creative problem-solving

Social interaction models stress the relationship of the individual to other persons and to society. (Table 3.4).

Table 3.4 Social Interaction Models

Model	Chief Exponents	Goals or Missions for which most Applicable
1. Group Investigation	1. Herbert Thelem 2. John Dewey	Designed for the development of skills for participation in democratic social process through combined emphasis on interpersonal skills and academic inquiry skills.
2. Jurisprudential	1. Donald Olive 2. James P. Shaver	Designed primarily to teach the Jurisprudential frame of reference as a way of thinking about and resolving social issues.
3. Laboratory Method	National Training Laboratory (NTL)	Designed for the development of interpersonal and social group skills and through this personal awareness and flexibility.
4. Role Playing	1. Famine Shafted 2. George shafted	Designed to induce students to inquire into personal and social values with their own behaviour and values becoming the source of inquiry.
5. Social Inquiry	1. Byren'Massialas 2. Benjamin Cox	Designed for the development of social problem-solving primarily through academic inquiry and logical reasoning.
6. Social stimulation	Sarene Boocock	Deigned to help students experience various social processes and realities and to examine their own reactions to them.

It may be noted that these models are not mutually exclusive. We find characteristics of one model apparent in some other models. Further, we find that information processing models, besides focussing on the development of intellectual skills and the acquisition of content, are also concerned with the development of

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social relations. Besides, some social interaction models emphasize on personal development of the individual.

Since education is meant for the all round development of the personality of the child, no single model could be selected. We may be required to employ several models according to the requirement of the situation, that is if some information is to be given, models of the information family would be required; if creativity is to be developed in the child; the synectic model would be needed; if tho objective is to eliminate anxiety and stress, the desensitization model would be needed; and if development of social skill is the objective, the group investigation model would be required.

The selection of a model can also be done in consideration of curriculum requirements. For example, a biology teacher may need the inductive model of Hilda Taba and the concept attainment model of Brunner, while a social studies teacher who proposes to teach about values would need the role playing model of Fannie Shaflel and George Shaftel, which motivates to inquire into personal and social values. Some situation would require an application of a combination of models. In the social studies class, the teacher may have the Inductive thinking model to help children master map skills and the group investigation model for discusing social issues.

Suggestions for the use of models in India: These models have been developed in foreign countries where the socio-economic conditions and cultural heritage are quite different from our country. So, while adopting/adapting these models we should take into consideration the following points:

1. There is little experimental evidence to establish the superiority of one model over the other.
2. We should not consider models of teaching as panacea for all the ailings from which our system of education suffers.
3. Transplantation of foreign models without making necessary changes in accordance with the philosophy of life of our people will be harmful for the nation. Vigourous and continuous research is needed for their adoption in our country.
4. Classes of activity to which the models can be related to should be identified. Models can be related to three important dimensions of the educational environment—the personal, the social and the intellectual. Balance should be maintained to develop the individual harmoniously.
5. We should be very cautious in deciding the model in terms of skills and knowledge outcomes and social effects it will have on the society.

Glaser model of teaching or basic teaching model

Basic teaching model was developed by Robert Glaser in 1962. It is termed as the basic model because it tries to explain the whole teaching process by dividing it into four basic components namely, (1) instructional objectives (2) entering behaviour (3) instructional procedures (4) performance assessment. All these four basic components of the teaching process interact and influence each other as explained in the diagram. (Fig. 3.1)

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1. Instructional objectives indicate the stipulated goals that a student is expected to attain after the completion of a part of instruction. These are usually based on Bloom's Taxonomy of objectives.
2. Entering behaviour implies the initial behaviour of the student before the beginning of instruction. The assessment of the entering behaviour is an important aspect of the instructional process.

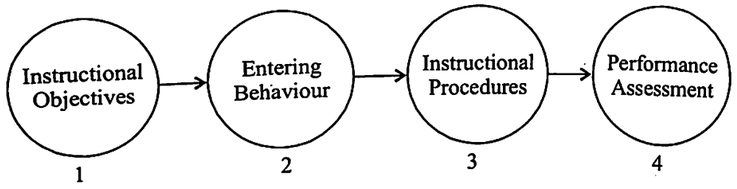


Fig. 3.1 Components of Teaching Process in Glaser's Basic Teaching Model

3. Instructional procedures represent the teaching methods, strategies and student-teacher interaction patterns involved in teaching. Instructional procedures are guided by the nature of the instructional objectives and the entering behaviour.
4. Performance assessment involves the extent to which the stipulated objectives have been fulfilled. It involves the use of suitable evaluation techniques like tests and observation. It serves as a feedback device for each of the steps and elements of the teaching process.

As a matter of fact, all these four basic components of the teaching process interact and influence each other. One sets the base for the other by providing as a base or feedback for the successful operation of the teaching act.

Description of Glaser's model

Glaser's model may be described in terms of the fundamental elements as under:

1. ***Focus:*** It attempts to pinpoint the processes and major activities comprising the entire teaching-learning process. It also brings into light the sequence to be followed in the instructional processes.
2. ***Syntax:*** The flow of activities in this model is sequential. First of all the objectives to be followed are fixed in accordance with Bloom's Taxonomy. Then the potentiality of the learners in terms of their entry behaviour is assessed. Thereafter, in the light of the entry behaviour, instructional work is carried out for the achievement of stipulated objectives. Performance assessment is the last phase.
3. ***Principles of reactions.*** Main principles of reaction are summarised below:
   (a) *Principle of interdependence*—The student's responses are to be understood and dealt with in the light of the interaction and interdependence of the four stages, i.e., objectives, entry behaviour, instructional process and assessment.
   (b) *Principle of active involvement*—Its proper execution requires a lot of activity on the part of the teacher. At every stage the teacher is expected to develop proper understanding of the poten-tial and difficulties of his students for achieving the objectives.
   (c) *Principle of follow up*—In case the results are not in accordance with the set objectives, gaps and deficiencies have to be found out and corrective measures taken.

Social system: The success of this model depends upon the ability and competency of the teacher in terms of various skills like formulation of objectives, use of proper strategies and techniques of evaluation.

Support System: The model for its success needs additional support in terms of (i) availability of adequate pre-service and in-service facilities to teachers to acquire needed competencies and skills for the use of the model (ii) availability of desirable teaching-learning environment and situations for the use of suitable teaching strategies (iii) availability of appropriate evaluation devices for the assessment of entry and terminal behaviour of the learners.

Applicability of the model: Being quite systematic and structured, this model is applicable to almost all learning- teaching situations.

Glaser's model indicates that teaching includes a wide range of decisions and practices and much of which requires little or no personal contact between the teacher and student. It implies a greater emphasis on the competency of the teacher than on his personality.

Classroom meeting model

Classroom meeting model was developed by William Glasser in 1965. It is based on the assumption that the success or failure of an individual depends more on the social factors rather than on his personal limitations. Through classroom meeting Glasser wants to see the whole school fully disciplined. All classroom meetings should result into model behaviour of the individuals. Each classroom meeting should be positive in nature and based on two basic needs namely, need for love and respect.

Description of the different elements of the model

1. ***Focus:*** The main aim of the model is to develop moral values and social norms among the students by providing appropriate social environment.

   Syntax: The model involves the following six phases:

   Phase 1. It is related to the creation and maintenance of a suitable climate of involvement and establishing adequate rapport with the students.

   Phase 2. It is concerned with the exposition of the problem for discussion.

   Phase 3. It involves encouraging the students to make value judgements about their behaviour.

   Phase 4. It relates to the identification of alternative courses, both by students and teachers, to find out the solution of the problem.

   Phase 5. In this phase, the teacher impresses upon the student to choose a selected path and pushes them for behaviour commitment.

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Phase 6. In this phase, followup is provided and the students carry out the decisions arrived at.

2. ***Principles of reaction:*** The main principles are as under:
   (i) Principle of active involvement which means that the teacher should show affection, sympathy, understanding and warmth to his students.
   (ii) Principle of value judgement which implies that the students are made to assess their own behaviour, to accept their weak points in their interpersonal and social behaviour and find solutions for them.
3. ***Social system:*** This model is moderately structured. The students initiate the problem and cooperatively discuss and find out its solutions. The leadership remains with the teacher but the latterremains non-judgmental. The moral authority remains with the students.
4. ***Support system:*** The teacher must provide proper environment for proper group discussion. He must create a climate of openness.

Applicability of the model: The model has been developed to prepare socially desirable individuals. It attempts to nurture openness and responsibility in students. It leads to the individual to make attempts to understand his own behaviour, seek value judgement and modify his behaviour for his self good and the good of the society.

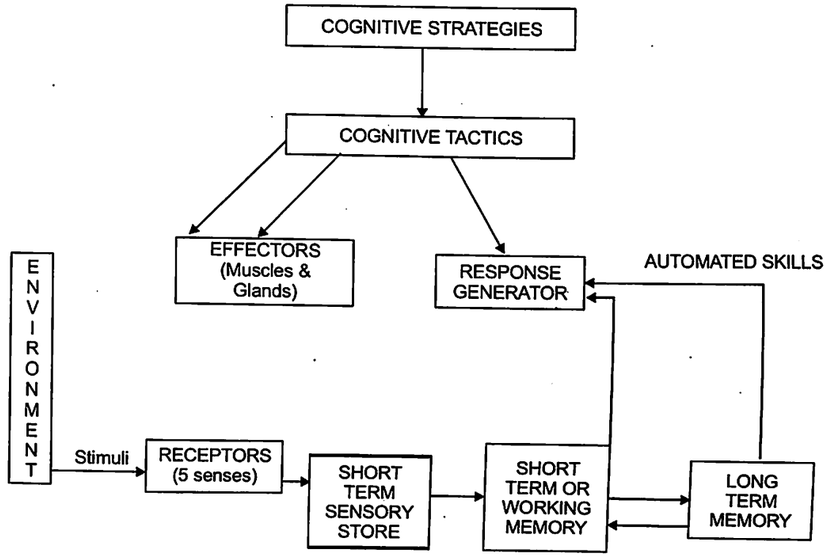
3.4 INFORMATION-PROCESSING MODELS

Cognitive psychologists promote the use of information-processing models to describe and explain the human mental process. Educators and trainers regularly use this model to guide their teaching methodologies. The model likens the human thought process to the working of a computer. It considers information to flow through various internal structures present in a learner. Similar to a computer, a human mind absorbs information, organizes and stores it to be retrieved and used at a later period. A better understanding of how information flows, is processed, stored and retrieved through the information-processing model, allows learners' to understand more efficiently and systematically.

In a computer, information is fed through input devices such as a keyboard or scanner. It is called the sensory register in the human mind, composed of the sensory organs such as the eyes and ears through which we receive information. In a computer, the information received is processed in the central processing unit, which corresponds to the working memory or short-term memory. This information is stored in the hard disk and displayed on the screen or as a printout. Similarly, the human mind stores information for further use or it is transferred to the long-term memory, which is the human hard disk, or is discarded. The product of this information is exhibited through behavior or actions. Human beings can extract the information from the long-term me, which can be thought of as our consciousness. In certain cases, automatised skills are transferred directly from the long-term memory to the response generator, such as the skills used in operating a machine by an expert without a second thought.

Check Your Progress

3. What are the characteristics of a teaching model?
4. What are the effects of teaching through modelling?
5. Identify the elements of a teaching model.



According to American educational psychologist Robert Mills Gagné (1993), when we try to comprehend memories and retrieve information, simulation from the environment activates the receptors. The entire information from the surrounding is replayed to the short-term sensory store for two functions. First, it filters out insignificant information and focuses on the crucial one through selective perception. However, the importance and relevance of an incident varies from person-to-person. Hence, people may remember different things of the same incident, after reading the same book, watching the same movie or listening to the same lecture. Second, it makes sense of the various patterns of stimulation impinging on it. For example, a series of sounds of fluctuating frequencies and amplitudes is: heard as speech; different colours and intensities of light entering the eye are decoded by the short-term sensory store and we see objects.

A combination of a number of cognitive tactics, hence, forms cognitive strategies. These strategies direct human behaviours while thinking, memorizing and attending, and also to select which of the cognitive strategies and tactics is to be implemented in a particular situation. The necessity to choose strategies is termed as the need to act meta-cognitively to control your learning behaviour. A meta-cognitive learner will always self-monitor one's learning strategies. After selecting a cognitive tactic to put in use, the learner has to stand outside to monitor while evaluating whether the strategy was correct. If not found efficient, the learner has to modify or even change the strategy.

Basic assumptions

The information-processing model is based on a number of assumptions; these are:

(i) Information processing in humans resembles that in computers
(ii) The environment provides information which is processed by a series of processing systems such as attention, perception, and short-term memory.
(iii) These processing systems transform the information systematically
(iv) The aim of research is to specify the processes and structures that underlie cognitive performance

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Information processing and attention

It has been observed that humans, when they selectively attend to an activity tend to ignore other stimulations, although they can be distracted by other sounds, such as calling of name or sound of a door bell. This tendency of selective attention has been an intriguing query for psychologists as they question how many things human beings can attend at the same time (attentional capacity).

One way of dealing with the question would be to consider humans as information processor who has the capacity to process only a limited amount of information at a given period without being overloaded.

Information-processing system



The information processing model, as shown above, indicates the flow of information from one stage to the next.

- Input processes are concerned with the analysis of the stimuli
- Storage processes cover everything that happens to stimuli internally in the brain and can include coding and manipulation of the stimuli
- Output processes are responsible for preparing an appropriate response to a stimulus.

Types of information processing

Information processing can be sequential or parallel, either of which may be centralized or decentralized (distributed). The parallel distributed processing approach, propagated in the mid-1980s, became popular as connectionism. In the early 1950s, Friedrich Hayek had advocated that the brain takes spontaneous order through decentralized networks of simple units (neurons).

The connectionist network is made up different nodes, and it works by a 'priming effect', and this happens when a 'prime node activates a connected node' (Sternberg & Sternberg, 2012). But 'unlike in semantic networks, it is not a single node that has a specific meaning, but rather the knowledge is represented in a combination of differently activated nodes' (Goldstein, as cited in Sternberg, 2012).

3.4.1 Models and Theories

There are several proposed models/theories that describe the way in which we process information.

Sternberg's Triarchic Theory of Intelligence

Sternberg's intelligence theory includes three components — creative, analytical, and practical abilities (Sternberg & Sternberg, 2012). Creativity is the talent of coming up with original ideas, and analytical ability allows a person to evaluate the positives and negatives and whether the idea is a good one or not. Practical abilities are used to implement the ideas and persuade others of their value (Sternberg & Sternberg, 2012).

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In the middle of Sternberg's theory is cognition and with that is information processing. According to Sternberg, information processing consist of three different parts — metacomponents, performance components, and knowledge-acquisition components (Sternberg & Sternberg, 2012). These processes move from higher-order executive functions to the lower-order. Metacomponents are used for planning and evaluating problems, while performance components follow the orders of the metacomponents, and the knowledge-acquisition component learns how to solve the problems (Sternberg & Sternberg, 2012). A practical implication of this theory would be like working on an art project. First the idea takes shape, then the concept is drawn mentally or is planned, and then a sketch is done. Through this entire process, the artist will monitor the work in progress. These steps come under the metacomponent processing, and the performance component would be the actual painting. The knowledge-acquisition portion would be learning how to draw what you want to draw.

Working memory

Information processing can be defined as the sciences concerned with gathering, manipulating, storing, retrieving, and classifying recorded information. It suggests that for information to be firmly implanted in memory, it must pass through three stages of mental processing; sensory memory, short-term memory, and long-term memory.

The working memory model is one such example. This includes the central executive, phonologic loop, episodic buffer, visuospatial sketchpad, verbal information, long-term memory, and visual information (Sternberg & Sternberg, 2012). The central executive is the one to decide what requires attention and how to respond. It has three sub-sections — phonological storage, sub-vocal rehearsal, and phonological loop. These sections work together to understand words, put the information into memory, and then hold the memory. The result is verbal information storage.

Visuospatial sketchpad is the next sub-section which stores visual images. The storage capacity is brief but leads to understanding of visual stimuli. Finally, there is an episodic buffer. This section collects information and puts it in long-term memory. It also takes information from the phonological loop and visuospatial sketchpad, combining them with long-term memory to make a unitary episodic representation (Sternberg & Sternberg, 2012). For these to work, the sensory register takes in via the five senses: visual, auditory, tactile, olfactory, and taste. These are present since birth and are able to handle simultaneous processing (e.g., food—taste it, smell it, see it). The benefits of learning become visible once there is a developed process of pattern recognition.

In general, learning benefits occur when there is a developed process of pattern recognition. The sensory register has an expanded capacity and its behavioral response is short (1–3 seconds). In this model, sensory store and short-term memory or working memory has limited capacity. Sensory store holds limited amounts of information for very limited time duration. (Sternberg & Sternberg, 2012).

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Short-term memory holds information for slightly longer period, but still has limited capacity. According to Linden (2007), 'The capacity of short-term memory (STM) had initially been estimated at seven plus or minus two items' (Miller 1956), which fits the observation from neuropsychological testing that the average digit span of healthy adults is about seven (Cowan and others 2005). However, these number of items can only be retained if they are formed into groups, using perceptual or conceptual associations between individual stimuli. Its duration is of 5–20 seconds before it is out of the subject's mind. This can be experienced when a new name is introduced to us. Here images and information based on reasoning are stored but is forgotten if not repeated. Long-term memory, however, has unlimited capacity (Sternberg & Sternberg, 2012) with indefinite duration. At times it becomes inaccessible as it stores a lot of information till that particular time. This is when people say they forget or partially remembers in information.

3.5 SUMMARY

In this unit, you have learnt that:

- Development of models of teaching is one of the recent innovations in teaching.
- A number of educationists and psychologists have proposed model- approach to teaching.
- The credit for transforming prevailing teaching theories into different models of teaching goes to Bruce Joyce and Marsha Weil (1980).
- Educators and psychologists have designed several types of teaching models which provide suitable guidelines to the teachers for modifying the behaviour of the learners.
- Bandura and Walters mention three kinds of effects in teaching by modelling. These are: (i) a modelling effect (ii) an inhibitary and disinhibitary effect and (iii) an eliciting effect.
- Among those in common use are 'modelling', 'imitation', 'observational learning', 'identification', 'copying', 'vicarious learning', 'social facilitation', and 'role playing.'
- A teaching model has six fundamental models: (i) focus (ii) syntax (iii) principles of reactions (iv) the social system (v) the support system (vi) Application context.
- Social interaction models stress the relationship of the individual to other persons and to society.
- Since education is meant for the all round development of the personality of the child, no single model could be selected.
- The selection of a model can also be done in consideration of curriculum requirements.
- Basic Teaching Model was developed by Robert Glaser in 1962.
- As a matter of fact, all these four basic components of the teaching process interact and influence each other.

Check Your Progress

6. What is an information processing model?
7. What is the basic concept of information-processing model?
8. Mention at least two basic assumptions of the model.
9. According to Sternberg, what are the three parts of information processing?

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- The success of this model depends upon the ability and competency of the teacher in terms of various skills like formulation of objectives, use of proper strategies, techniques of evaluation etc.
- Classroom Meeting Model was developed by William Glasser in 1965. It is based on the assumption that the success or failure of an individual depends more on the social factors rather than on his personal limitations.
- The model has been developed to prepare socially desirable individuals.
- Cognitive psychologists promote the use of information-processing models to describe and explain the human mental process.
- Similar to a computer, a human mind absorbs information, organizes and stores it to be retrieved and used at a later period.
- According to American educational psychologist Robert Mills Gagné (1993), when we try to comprehend memories and retrieve information, simulation from the environment activates the receptors.
- A combination of a number of cognitive tactics, hence, forms cognitive strategies.
- It has been observed that humans, when they selectively attend to an activity tend to ignore other stimulations, although they can be distracted by other sounds, such as calling of name or sound of a door bell.
- Sternberg's intelligence theory includes three components — creative, analytical, and practical abilities.
- Information processing can be defined as the sciences concerned with gathering, manipulating, storing, retrieving, and classifying recorded information. It suggests that for information to be firmly implanted in memory, it must pass through three stages of mental processing; sensory memory, short-term memory, and long-term memory.
- In general, learning benefits occur when there is a developed process of pattern recognition.
- Short-term memory holds information for slightly longer period, but still has limited capacity.

3.6 KEY TERMS

- **Performance assessment:** Performance assessment involves the extent to which the stipulated objectives have been fulfilled.
- **Behaviour modification models:** They stress on changing the external behaviour of the learners and describe them in terms of visible behaviour rather than underlying behaviour.
- **Information processing models:** They refer to the way people handle stimuli from the environment, organise data, sense problems, generate concepts and solution to problems and use verbal and non-verbal symbols.

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3.7 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Accroding to Jangira and Singh, a model of teaching is a set of inter-related components arranged in a sequence which provides guidelines to realise a specific goal. It helps in designing instructional activities and environmental facilities, carrying out of these activities and realization of the stipulated objectives.
2. Paul D. Eggen explains, as an engineer, in considering a project, first identifies the type of structure to be built, e.g., a building, a bridge or a road. Having done this, he selects an appropriate design or blueprint to follow in building that structure. The specifications of the blueprint determine the actions of the builder takes and the kind of building that will result. The particular type of blueprint or model chosen depends on the type of structure to be built. In a similar manner a teacher considering the choice of a teaching model first identifies what is to be taught and then selects a model in accordance with that goal. The model chosen is specifically designed to achieve a particular set of objectives and will determine in large part of the actions of the teachers.
3. Some common identifiable characteristics of a good model, are given below:
    1. Specification of learning outcome. All models of teaching specify what the students should perform after completing an instructional sequence.
    2. Specification of environment. A teaching niodel specifies in definite' terms the environmental conditions under which a student's response should be observed.
    3. Specification of criterion of performance. A model of teaching specifies the criterion of performance which is expected from the students.
    4. Specification of operations. A model of teaching specifies the mechanism that provides for the reaction of students and interaction with the environment.
    5. Scientific procedure. A model of teaching is based on a systematic procedure to modify the behaviour of the learner. It is not a haphazard combination of facts.
4. Bandura and Walters mention three kinds of effects in teaching by modelling. These are: (i) A modelling effect (ii) An inhibitary and disinhibitary effect and (iii) An eliciting effect.
5. A teaching model has six fundamental elements: (i) focus (ii) syntax (iii) principles of reactions (iv) social system (v) support system (vi) application context.
6. Information-processing models refer to the way people handle stimuli from the environment, organise data, sense problems, generate concepts and solution to problems and use verbal and nonverbal symbols.
7. The information-processing model likens the human thought process to the working of a computer. It considers information to flow through various internal structures present in a learner.
8. The information-processing model is based on a number of assumptions; two of them are:
    (i) Information processing in humans resembles that in computers
    (ii) The environment provides information which is processed by a series of processing systems such as attention, perception, and short-term memory.
9. According to Sternberg, information processing consist of three different parts — metacomponents, performance components, and knowledge-acquisition components.

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3.8 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What do you understand by teaching models?
2. What are the functions of teaching models?
3. What are the five-fold classifications of teaching models?
4. What is information-processing system?

Long-Answer Questions

1. Explain the different types of modern teaching models.
2. Discuss Glaser's model of teaching. How is it different from the classroom meeting model of William Glasser?
3. Why is Bruce Joyce and Marsha Weil credited for transforming the teaching theories. Discuss.
4. Discuss the various theories of information-processing models.

3.9 FURTHER READING

Dwight, A. & Ryam, K.; *Micro Teaching*, Addison Weslly Publishing Co., London, 1969.

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UNIT 4 PROCESS OF COMMUNICATION AND INSTRUCTION

Structure

4.0 Introduction
4.1 Unit Objectives
4.2 Concept of Communication
  4.2.1 Principle Modes
  4.2.2 Barriers
  4.2.3 Classroom Communication
4.3 Modalities of Teaching
  4.3.1 Differences between Teaching and Instructions
  4.3.2 Conditioning and Training
4.4 Summary
4.5 Key Terms
4.6 Answers to 'Check Your Progress'
4.7 Questions and Exercises
4.8 Further Reading

4.0 INTRODUCTION

In the modern world of science and technology where man is moving towards more and more advancement, we cannot deny the fact that our education system is also being affected. However, the success of education cannot be achieved merely by replacing human beings with technologies. It needs a right blend of both labour and scientific inventions. We have to utilize the existing resources to improve the way we communicate with each other. To make the process of teaching–learning more effective, communication, as the most important tool, should be used in a proper way. The teacher should communicate facts, skills, ideas and attitude. However, it has been found that there are some principles of communication which may help in improving the relationship between teachers and students. Communication is a powerful means of bringing about social change. The revolution in media has helped in accelerating the pace of social change during the last few decades. Teaching will only be effective if its outcome is positive. As we know all students are not the same, additional material should be available to help each one of them. Skinner developed one such implement known as 'teaching machine'. It is very helpful in the activity of memorization.

In this unit, you will learn about the process of communication in a classroom, the modalities of tracking, and the differences between teaching and instructions

4.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Define communication and instruction
- Explain communication cycle

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- Discuss the concept of teaching along with its different phases
- Identify the constituent parts of a teaching machine
- Discuss the role of teaching machine in improving the process of teaching

4.2 CONCEPT OF COMMUNICATION

Man is a social animal and his ability to communicate is the prime factor that distinguishes him from other animals. Apart from basic necessities, one needs to be equipped with good communication skills. We always want to share our thoughts, feelings, ideas and beliefs with people around us. We can exchange information through words, gestures, signs and symbols, expressions, and tone etc. One can also make use of technical media like telegraphy, radio, television, and computer, etc., for interaction. This interaction is called communication. The word communication is derived from the Latin word '***communicare***' which means to share, is the process of transmitting information and understanding. Communication is a complex and ongoing process. It is a process of exchanging verbal and non-verbal messages. The way we communicate is a learned style. We grow up watching our parents and other people communicate with each other. As adults, we can learn improved ways of communication by observing others who communicate effectively, learning new skills and practising those skills. The ability to effectively communicate at work, home and in life is probably one of the most important sets of skills a person needs. In the process of teaching–learning, communication plays a very important role. If a teacher is a good communicator, only then will he/she be able to interact with students properly to make them understand his/her ideas or thoughts. Any idea or thought which is not shared is of no use. Hence, communication is a must as it involves transmission of message by a sender and its proper understanding by the receiver.

Definitions of communication

Some of the important definitions of the process of communication are as follows:

- Newman and Summer defined communication as an exchange of facts, ideas, opinions or emotions between two or more persons.
- According to Hoben, 'Communication is the verbal interchange of thoughts or ideas.'
- According to Anderson, 'Communication is the process, by which we understand others and in turn, endeavour to be understood by them. It is dynamic, constantly changing and shifting in response to the total situation.'
- According to Shannon and Weaver, 'Communication involves all the procedures by which one mind may affect another. This involves not only written and oral speech, but also music, pictorial arts, theatre, ballet, and in fact all human behaviour.'
- According to Merrihus, 'Communication is a process of mutual exchange of thoughts, ideas, facts and emotions.'
- According to John Dewey, 'communication is a process of sharing experiences till it becomes a common possession'.

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Characteristics

Communication has some basic characteristics, which are discussed as follows:

- **Purposeful:** Communication always involves a purpose. Whenever an idea or thought arises in the mind of a sender, he wants to communicate it. This mean there is always some purpose behind it. The purpose of communication is to impact attitudes and behaviour of those involved.
- **Universal:** Communication is the only way through which human beings can share information. Thus, communication is a universal process as it occurs almost everywhere.
- **Interactive:** Interaction is primary characteristic of communication in which two or more persons or groups interact with each other. It may results in social interaction. Thus, it is a two-way dynamic flow of information.
- **Imperfect:** A perfect communication is never possible in reality because what a person thinks can never be exactly understood by the receiver. This is because every individual is different from the other and perfect synchronization of minds is never possible.
- **Dependent:** Communication is performed with the help of some media. Communication is now carried out through various channels or modes, ranging from sophisticated communication media and technology, to non-verbal signals. So, it is dependent on some media through which message from one person could be sent to another.
- **Complex:** Communication is a complex process which involves various steps. A number of barriers can hinder this process at both ends (sender and receiver).
- **Contextual:** Communication always takes place within a context. The context of communication has at least four dimensions: (i) physical, (ii) social, (iii) psychological (iv) temporal. These dimensions interact and influence, and are influenced by one another.

Importance of communication

As we have already discussed, communication is nothing but transmission and understanding of message from sender to receiver. It is a very important aspect of human life because it is only through communication that human beings can interact with each other as individuals and as independent groups. It is an essential and basic process in all fields of life. Communication skills can be used virtually in every field. Effective communication is important because it allows people to lead more satisfying lives. Some other reasons which explain why communication is important are as follows:

- **Transmission of information:** Communication is must to transfer information between individuals and places. Any message which is not communicated is of no use.
- **Displaying ideas/emotions:** Whether it is in written or oral form, we always express ourselves by communicating with others. Without communication, we are not able to express our feeling or ideas. Hence, communication is important to transmit emotions/ideas.

- **Education:** The whole process of education involves imparting of knowledge to students by the teacher. However, this knowledge is imparted by various media which depend on communication. Education without communication is impossible.
- **In relationships:** Communication plays a vital role in building relationships between people. It facilitates dialogue, exchange of expression and emotions which result in relationships. The type of communication decides the relation. It could be personal or professional.
- **Entertainment:** To break away from the daily schedule of life full of stress, entertainment is a crucial part of everyone's life. Nowadays, every source of entertainment like movies, music, television shows, games, theatre or even anecdotes narrated by people involve communication.
- **Achievement of goals:** The ability and the importance of communication become much more crucial when we are on a mission, or need to achieve a goal. Without a means to communicate, an organization will become isolated. The ability to effectively communicate is very important to achieve the set goals.
- **Cultural promotion:** Communication offers a prospect to promote and preserve culture and traditions. It helps people in fulfilling their desire to be creative.
- **Integration:** It is with the help of communication that many people in a large number of countries all over the world, gain awareness related to each other's customs and tend to admire each other's lifestyle and culture. It progresses the activity of being integrated and tolerant with respect to each other.
- **Discussion**: The processes of debating and discussing elucidate various perspectives on matters that are of interest to people. With the help of communication, the reasons for difference in opinions and imparting of new ideas to others can be pinpointed.

Communication cycle

The process of communication consists of a message being sent and received (Figure 4.1). The effectiveness of communication can be estimated by the similarity between the message sent and the one received.

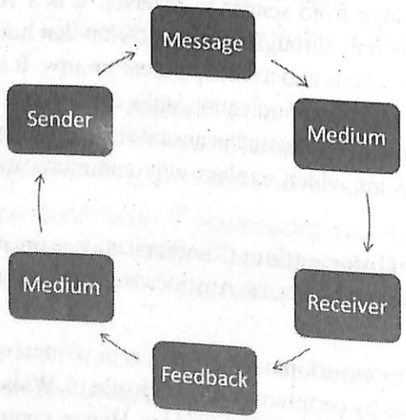


Fig. 4.1 Communication Cycle

Thus, it is a two-way process in which information is sent by one person and received by the other. It is a continuous process in which different steps are followed for proper understanding and effective communication. The process of communication can be explained with the help of a communication cycle, which involves the following:

- **Sender of the message:** Initiation of the process of communication is done by a sender or communicator who conceptualizes the idea that is to be transmitted. A sender is a person who initiates communication by making use of language or symbols to convey the message. The views, advancement, ability, mindset, capability and awareness of the sender have a great impact on the message. It is also very important to choose correct symbols, depending on the audience and the environment. It is essential to select appropriate spoken and written symbols to ensure that the message is interpreted correctly by the receiver.

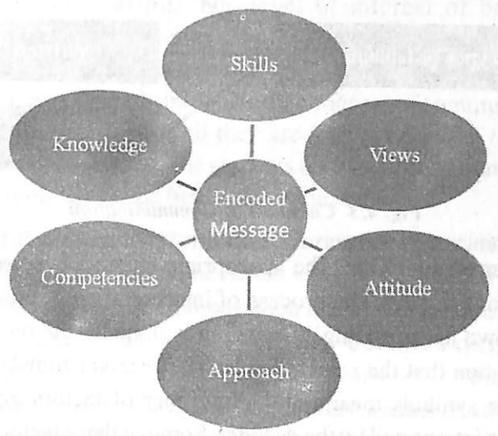


Fig. 4.2 Conditions Affecting a Message

- **Message:** The process of communication begins with finalization of the message to be conveyed. Message is a key idea, thought, opinion, feeling, knowledge or information, which sender wants to communicate. A message is sent by the source and received by the destination. It is encoded in a way that can be understood by both the sender and the receiver. A message can be written or oral. It may be well-organized and structured, or unorganized and unstructured depending upon the nature of the communication. Anything which conveys thoughts or feelings can be considered a message, for example, a painter communicates through his paintings, a writer communicates with the help of his writings, a person with speech or learing problem communicates through symbols or movement of fingers, an actor can convey his message through expressions. All these examples can be considered messages.
- **Channels of communication:** In order to convey what the information means to the receiver, the sender uses the process of encoding. In encoding, information is translated into a format which can be understood by the receiver. Information is either oral, written or visual. The medium or means which a sender employs to convey his message is known as 'channel of communication'. Through this channel, the sender is connected to the receiver. The majority of channels transfer information in either verbal or written format. However at present, visual

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channels are gaining popularity due to expansion of technology. Some common official channels of communication are: letter, memorandum, e-mail, telephone, fax, telegram or television. Every channel has its own advantages and disadvantages. It is important to select a suitable channel for communicating effectively and for correct interpretation of the message by the receiver. For instance, written channels are more effective when the receiver of the message is a small group of people. Similarly, the effectiveness of oral channels is more when the receivers require quick feedback. Some situations require use of both written and verbal modes of communication. Thus, sender has to select right kind of channel (Figure 4.3) for the message to reach the right receiver.

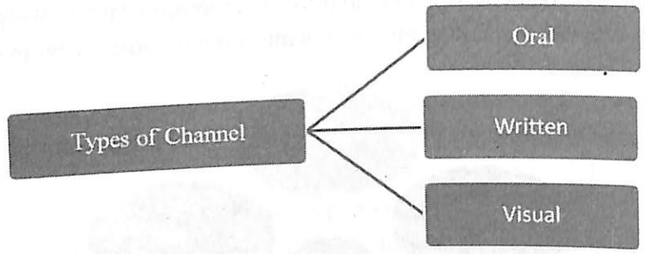


Fig. 4.3 Channels of Communication

Receiver of the message: Once the appropriate channel is selected, the decoding stage of the message begins. The process of interpretation of the information that is transferred is known as 'decoding'. Decoding is done by the receiver. The receiver interprets information that the sender sends. The receiver translates the message in order to make the symbols meaningful. A number of factors govern the extent to which a message is interpreted by the decoder. Some of these factors are: the receiver's knowledge, his sensitivity to the message, and the degree of dependence of the encoder on the decoder. Successful communication takes place when the receiver correctly interprets the sender's message.

Feedback: The most important part of the communication process is the feedback. On the basis of this component, the sender analyses how effective the message is. If there is no feedback, the sender would not be able to make sure that the message has been interpreted by the receiver. There would be no way of knowing if meaning had been shared. Once the message is received by the receiver, he sends a response to the sender. The signal might probably be a spoken comment, a written message, a smile, or any other similar activity. Hence, one can assume that feedback may be in the form of words, or in the form of smiles, and sighs.

4.2.1 Principle Modes

At the time of communicating, it is very important to consider some of the general principles of communication. These principles are the same for all human beings, no matter what ethnicity or culture they may be part of. These principles help to overcome all barriers of communication and make the process more successful. Thus, it is important to consider some of the general principles of communication to make the process more effective. Following are some important principles which should be kept in mind, during the process of communication:

NOTES

(i) **Principle of mastery on language:** Verbal communication is the most widely used form of communication. It uses language to express thoughts and ideas. Mastery of language is vital for effective communication. The sender or source of communication should use the language which is easy for the receiver to understand. In a classroom, the teacher should be fluent in the language which the students understand; only then it will be possible for him to convey the message to students. Individuals without this mastery are prone to be misunderstood and their efforts to communicate their ideas may not be successful. Sometimes, a teacher is very good in his subject, but it is of no use if he is not able to communicate the knowledge to his students. Therefore, both the teacher and the students should have a good command on the language used to transfer knowledge in a classroom.

(ii) **Principle of motivation:** The level of interest of both the source of communication and the receiver should be interested throughout the process of communication. Lack of motivation, interest and zeal on part of the sender or the receiver may adversely influence the progress of communication. A teacher cannot teach the students until they are interested in the topic being taught. Hence, he needs to motivate the students for proper communication. The higher the level of motivation, the better the communication.

(iii) **Principle of sharing and interaction:** During communication it is important to be sensitive to the others and be aware of how the receiver is interpreting the message. The success of communication lies in sharing and mutual interaction between the sender and the receiver. A teacher should always involve the students while teaching to increase interaction and effectiveness of the teaching–learning process. Sharing of ideas and interaction between teacher and students is necessary to develop a relationship based on understanding and mutual experiences.

(iv) **Principle of active listening:** Listening is an important aspect of communication and this role is played by the receiver of the message. To become an effective communicator, it is very important to listen to the other person. If the sender is not a good listener, it would be very difficult to understand what someone is trying to say. A lot of misunderstanding and misinterpretation can occur if there is lack of proper listening. Active listening ensures that the sender's message is received both effectively and efficiently. A lot of misunderstanding and misinterpretation may be caused by not listening to the other person. A listener must be able to make sense out of what he hears, only then it will be called active listening. Although listening is not communication in itself, it is still an integral part of communication.

(v) **Principle of suitability of communication contents:** The content which is to be communicated should have a definite purpose, cohesiveness and usefulness for the receiver. The content should be suitable and appropriate for both the sender and the receiver. The sender should be familiarized with the content to be communicated. On the receiver's end, the content should be suitable enough to be grasped so that he can respond properly.

(vi) **Principle of using appropriate channel:** Selection of the wrong communication channel can cause communication obstacles and inadequate feedback. Effective communication relies on selecting an appropriate communication channel for sending the message. While selecting the



communication medium, one should keep in mind the purpose of the message. More than one communication channel should be selected in order to reinforce information. For example, in a classroom it is always suggested to use various teaching aids, which may help students in better understanding of the topic being taught.

(vii) **Principle of conductive environment:** A conducive environment is a very vital constituent for facilitating effective communication. The communication process should be protected from noise, disturbance, poor pronunciation, improper ventilation, etc., because in the presence of all these factors, communication may not be successful. Hence, to enhance the effectiveness of communication, a conductive atmosphere is necessary.

(viii) **Principle of competency:** Competency is required at both the sender's and receiver's end in terms of communicating and receiving the desired information. Both of them should possess the communication skills which help the sender in sending the message and the receiver in the receiving the message effectively. In a classroom, the teacher must be equipped with sufficient knowledge and skills to transfer information to the pupils.

(ix) **Principle of appropriate body language:** Appropriate body language also plays a very important role in the communication process. One of the most influential modes of communication in day-to-day interaction is our body language, which includes eye contact, gestures, body stance and facial expressions. Individuals with improper body language are prone to be misunderstood and do not succeed in communicating their ideas. In a classroom, the teacher uses ample body language, but if it does not match with the words conveyed, the students may get confused and that will result in poor communication.

(x) **Principle of appropriate feedback:** Appropriate feedback from receiving end conveys that the message of the sender has been received and interpreted correctly. The feedback can also work in reverse order from the source to the receiver's end. If a teacher gets proper feedback from the students, it will help him understand whether the communication is effective or not. In the same way, when students get feedback of their performance from the teacher, they get motivated and that results in better communication. In the absence of proper feedback, communication would be incomplete and improper.

(xi) **Principle of using example:** The addition of examples always make the message more interesting. For instance, various visual slides or other material related to the topic can result in better communication, especially, in the classroom where the teacher has to deliver a lecture. He may use a number of routine real-life examples so that his pupils understand the lesson better.

(xii) **Principle of friendly nature:** Friendly attitude of sender can also help in receiving the message in a better way. Fear and threat of a senior or a more qualified person may make the receiver conscious and he may not interpret the message properly. For example, if a teacher is too strict, the students will not try to clear their doubts for fear of being punished. On the other hand, if the teacher is friendly, students feel comfortable in asking questions and even giving feedback.

4.2.2 Barriers

Barriers to communication have made the process complex, difficult and frustrating. Communication is effective if it flows freely through an appropriate medium between the sender and the receiver. Free flow means uninterrupted transmission of information or message, correct comprehension of the message by the receiver, and relevant and appropriate feedback from him. Problems with any one of the components of communication can become a barrier to communication. Barriers to communications range from simple distracting noises to complex psychological factors. These barriers may cause simple communication gaps or total failure of communication. Some major barriers of communication are as follows:

(i) **Lack of common language:** Language uses oral or written symbols to transmit messages from one person to another. If the sender and the receiver of a message do not belong to the same language group, then this deficiency will pose as an obstacle to the process of communication. The sender and the receiver will not be able to communicate with each other if they do not know a common language. Communication will not be possible between a boy who can only speak in English and another boy who can only speak in French.

(ii) **Semantic barrier:** It is possible for one word to have many different meanings. It is not necessary for the meaning that is ascribed to a word by the communicator to be the same as that ascribed by the receiver to the same word. One word can have different meaning for different people at different points of time. Hence, it is possible that the sender and the receiver, most of the time, ascribe different meanings to the same word. Occasionally, they might possibly make use of dissimilar words to communicate the same meaning.

(iii) **Poor listening:** Poor listening skills are one of the chief problems when communicating. If people are attentive in listening to the message, a lot of misunderstanding can be reduced. A large number of people do not pay value-added attention to the message because of a variety of disturbances, feelings, enthusiasm, absence of interest, unwarranted assertiveness and roving concentration. This usually leads to misunderstanding and conflict.

(iv) **Poor vocabulary:** Low level of vocabulary is an obstacle to the communicator in conveying the message in its exact form. It makes the message more complicated and reduces its effectiveness. If the recipient cannot figure out the words, he will not be able to comprehend the sentences.

(v) **Noise:** A lot of noise also affects communication. Noise is usually, but not always, in the form of sounds. It can be visual, audiovisual, written, physical or psychological. Noise, in a physical form denotes the loud noise made by machines or speaker or other such things. Noise occurs when a student arrives late for a class and his arrival becomes a source of distraction for others in that class. Bad handwriting and incorrect typing leads to written noise. Psychological noise refers to mental trouble and turmoil, inattentiveness and indifference.

(vi) **Time:** Time factor may also hinder the process of communication. For example, a phone call at midnight may irritate the receiver and he person may not listen to the communicator. Thus, his communication becomes ineffective. The best of communication may prove to be ineffective if it does not take place at the right time.

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(vii) **Distance:** The distance between one who communicates the message and one who receives it may be a strong obstacle to communication. This can be due to absence of technical equipment such as telephone, and telefax and for linking them. An unfavourable system of seating in the classroom can give rise to a type of communication gap, which can be eradicated by making adjustments in the distance.

(viii) **Attitudes and values:** People interpret message on the basis of their attitudes and values. If a message is adverse for the receiver, it will not be able to persuade him easily. Thus, personal attitudes, values and opinions are transformed into obstacles, in the process of effective communication. Negative attitude of a teacher or a student may affect communication in the classroom.

(ix) **Emotional barrier:** Emotions refer to the way we feel about the world around us. Constructive emotions like happiness, adoration or liking make the flow of communication smooth. However, negative emotions like fear, distrust, anger, anxiety and hatred, work as powerful hindrances to efficient means of communicating.

(x) **Different perceptions:** Different perceptions of different people have their own limitations. According to Francis Bacon, 'Man prefers to believe what he prefers to be true.' Our reality is created by us with the help of selective perception. This conceals specific things that are present and reveals other more specific things, in addition to those which are already present. Every person's experience and his way of interpreting things are never the same since every person has perception his own. A communication barrier emerges, when the same object or concept is interpreted differently by two or more people.

(xi) **Wrong channel:** At times, simple rules for selection of a channel cause more problems than they solve. In selection of a channel, the sender needs to be sensitive to things like complexity of message, consequences of a misunderstanding, knowledge, skills and abilities of the receiver and timely response on receiving the message.

(xii) **Poor retention:** There is a limit to the functioning of human memory. Everything that is said cannot be always retained. The retention is even lower if the receiver is not interested or attentive. This causes a breakdown in the process of communication.

(xiii) **Closed mindedness:** It is not at all easy to communicate with a person with intense prejudice. Such person is not ready to receive any message on a subject about which he believes that he knows everything. His mind is closed to new ideas, facts and proposals. Hence, he completely rejects the information and recommendations of the communicator, even before he knows the real facts.

(xiv) **Physical distractions:** Physical distractions are physical things that interrupt communication. For example, uncomfortable seating arrangement makes it difficult for a learner to concentrate on the communication.

(xv) **Lack of proper feedback:** Without feedback, communication is oneway. Feedback in terms of proper motivation, incentives, zeal and enthusiasm is needed on the part of the sender and the receiver. If, in a classroom the teacher is not getting feedback of his teaching, he may never achieve the actual goal of teaching.

(xvi) **Too much information:** Excess of information also acts as communication barrier. A lot of information faces many drawbacks and different respondents react differently to filter the information and receive only what they need. Hence for effective communication, the amount of information can be reduced.

4.2.3 Classroom Communication

There is nothing in this world that would be achievable without the process of communication. There are different modes of communication, depending on the environment or situation and also on the number of people involved. Let us discuss all of these one by one:

1. **Mode of communication:** A person can communicate with the help of both language and expression. If there is use of language it is called verbal communication. However, communication that takes place without language, with the help of expression only is known as non-verbal communication.
   (i) ***Verbal communication:*** Language is an important factor and base of any verbal communication. Communication which makes use of oral or written form of language is termed as verbal communication. We have different types of languages like regional, national and international, for communication. In a classroom, the teacher mostly communicates verbally and writes words or sentence on the blackboard. Verbal communication with students is through questioning, lecturing, guiding, explaining or demonstrating. In this way, we can say that verbal communication combines both written and oral forms, which results in effective communication. For effective verbal communication, the following things should be kept in mind:
      (a) The language must be clear and proper.
      (b) It is important for the message to be short and to the point, but absolute in every way.
      (c) The communicator must have a good vocabulary.
      (d) The message must be appealing not only to the mind but also to the spirit of the listener.

   Advantages of verbal communication

      (a) Verbal communication provides immediate feedback, which helps the communicator in knowing the receiver's response. It also helps him to change his message in such a way that it becomes easy for the receiver.
      (b) The sender can provide easy clarification of things, which have not been understood by the receiver.
      (c) Verbal messages can be transmitted in a very less time, as compared to any other form of communication.
      (d) Vocal directions and instructions are successful in taking control of the state of affairs to make sure that the objectives are fulfilled.
      (e) Oral communication is a convenient and reliable media for communicating in committees, conferences and meetings, where a number of people come together for discussion.

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Disadvantages of verbal communication

(a) Oral communication can be of very high-quality and useful if the conversationalist is a fine speaker.

(b) The verbal message may reach the receiver in a distorted form. This unclear message could be the reason of his misapprehension and misconception of it.

(c) Due to lack of proper recalling, people may find it problematic to remember the key ideas of realistic facts which are conveyed orally.

(d) Meetings can be costly in terms of time and money.

(ii) ***Non-verbal communication:*** There are many ways used by people to communicate, other than verbal communication. Messages that are conveyed through body language, facial expression or code language, without taking help of verbal or written language are known as non-verbal communication. In some cases (with people who are not able to speak and listen (dumb and deaf), mentally challenged persons or who do not know the language of the sender) use of non-verbal communication becomes a compulsion. This type of communication is very often used along with verbal communication to make it more effective. Non-verbal communication can be of following types:

(a) *Body language*: Feelings, thoughts or ideas can be conveyed with the help of body language. Various postures and movements of body can convey various messages. Different people in different profession makes use of body language and convey the feelings like happiness, fear, anxieties, jealous, love and sympathy. A dancer while performing can convey feelings with the help of various postures. Similarly, a teacher can show love for the students, lawyers can very well use various postures to evoke the answers from their clients and so on.

(b) *Facial expression*: It is rightly said that face is a mirror for one's emotions. Intentions of a person can be very easily studied by his facial expressions. When a person is angry or happy, it can be clearly observed through the facial expression. These expressions are similar and universal. For non-verbal communication, these are most suitable and effective.

(c) *Language of eye:* Language of eyes can be declared as another important form of non-verbal communication. It is very simple and easy to understand the language of eyes. Widening or narrowing of pupils and movement of eyelids convey messages to the receiver.

(d) *Symbolic code language:* In news bulletin for the deaf and dumb on television, special code language is used. This is easily understood by them. Even in our day-to-day activities, we use various symbols or codes to convey messages. Detectives use code language to pass on secret information.

2. **On the basis of the number of people:** Communication can take place between two or more individuals. Hence, based on the number of individuals involved, we can divide communication into following:

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(i) ***One-to-one communication*:** It occurs between two individuals. A friend talking to other, a teacher talking to a student or talks between a father and a son are some examples of one-to-one communication. It can be both formal and informal type.

(ii) ***Small-group communication*:** This type of communication occurs among more than two individuals. Communication between families, neighbours and friends are examples of this type of communication.

(iii) ***Public communication*:** This type of communication is mostly formal and involves a number of people. Morning assemblies in schools or preaching at religious places are examples of this type of communication.

(iv) ***Organizational communication*:** This type of communication occurs within the boundaries of an organization or institution, for instance, communication in hospital, army, or any educational institute.

(v) ***Mass communication***: This type of communication is broad and it involves ways to communicate with masses. It is carried out through different types of mechanical means, appliances and mass media such as television, radio, books, and videos. Individuals living in any part of the world can be involved in mass communication.

3. **Communication on the basis of environment:** Communication can take place in a variety of situations or environment. Depending upon the environment, we may divide communication into two types:

(i) ***Formal communication:*** When communication takes place in a well-set environment with proper rules and regulations to achieve predetermined objectives, it is called formal communication. In events that require public speaking, mass communication, and official communication formal communication is used. Here, language is used more precisely and there is a higher focus on grammar.

(ii) ***Informal communication*:** When communication is not pre-planned and it is free of rules and regulations with minimum formalities, it is known as informal communication. In this type of communication, focus on the structure of language and grammar is very less. There is also lesser focus on non-verbal behaviour like attire, way of walking, and stance. Any type of communication between a group of friends outside the school or college can be taken as an example of informal communication.

4. **Communication on the basis of its direction of flow in an organization:** On the basis of this criteria, there are the following two types of communication:

(i) ***Upward communication:*** In this type of communication, message is initiated by subordinates and is received by superiors. In an organization, people in the top management use this type of communication to be aware of the needs, requirements, problems and complaints of employees. It also helps them in sound decision-making, based on the information received from employees. This type of communication provides an opportunity to employees to communicate their issues to the top management, Upward communication takes place in meetings, counselling, correspondence, and reports.

(ii) ***Downward communication:*** This type of communication is initiated by people at higher positions in an organization. For the success of an

organization, effective downward communication is very important. The communication of management with employees is necessary for organizing, coordinating and directing the operations of an organization. Downward communication flows through speeches, instructions, meetings, telephones, letters, pamphlets, etc.

Every type of communication is unique and it makes everyone special and unique. Various types of communication enable us to enhance our communication skills, verbal or non-verbal.

4.3 MODALITIES OF TEACHING

Teaching is considered as a social phenomenon. Teaching is an art in which a teacher influences his students and motivates them for learning. Students learn and develop according to the ideals set before them by teachers. Teaching is nothing but an organized set of activities, as a result of which pre-determined objectives are achieved. The success of teaching process depends upon the sincerity and hard work of teachers. Communication plays a big role in teaching as the whole process of teaching involves various forms of communication. Teaching should not be confused with conditioning, training, instruction and indoctrination. However, all these may help in the process of teaching. Teaching is more complex, wide and comprehensive in comparison to all these four terms. A teacher should have a number of skills. Let us discuss the whole process of teaching and some steps, which are performed by teacher.

A few popular definitions of teaching are as follows:

- In the words of Brubacher (1939): 'Teaching is an arrangement and manipulation of a situation, in which there are gaps or obstructions which an individual will seek to overcome.'
- According to Morrison (1934): 'Teaching is an intimate contact between a more mature personality and a less mature one, which is designed to further the education of the latter.'
- According to Smith (1961): 'Teaching is a system of actions intended to reduce learning.'
- According to Clark (1970): 'Teaching refers to activities that are designed and performed to produce change in student behaviour.'

Assumptions of teaching

Some assumptions of teaching are as follows:

(i) The teacher is a professional who is capable of making rationale, humane and creative decisions.

(ii) The primary purpose of teaching is to facilitate student learning.

(iii) Student learning can be measured only through observations that reveal changes in behaviours.

(iv) The act of teaching is a complex process that is influenced by a field of forces, of which teachers can be aware only in part and which they can only partially control.

Check Your Progress

1. Define communication as stated by Merrihus.
2. What is encoding?
3. What is the principle of mastery on language?
4. What are the barriers of communication?
5. What is upward communication?
6. Define classroom communication.

(v) Teaching is an activity that can be described and analysed.

(vi) Teachers should teach objectively and enable students to evaluate their teachings.

Characteristics of teaching

According to the definitions and assumptions of teaching, the characteristics of teaching can be interpreted in the following ways:

(i) Teaching is an interactive process between a teacher and a learner. It is not a one-sided affair as both the learner and the teacher have to be fully active during this process.

(ii) Teaching is not an independent activity as it cannot happen in vacuum. It takes place in some social setup where the teacher aims at modifying the behaviour of an individual or group.

(iii) Teaching is both formal and informal. Both the ways, it help in achieving desired goals.

(iv) The process of teaching is carried out to achieve some specific aims and objectives.

(v) Teaching is a cooperative activity and a teacher should involve students in different classroom activities such as organization, management, discussion, recitation and evaluation.

(vi) Teaching is dominated by the process of communication. Good communication skills make teaching interesting and lively.

(vii) Teaching is not only about motivating students to learn, but also enabling them to learn in a manner that is relevant, meaningful and memorable.

(viii) The main aim of teaching is to provide guidance to learners, according to their capabilities.

(ix) The purpose of good teaching is to develop independence of thought, self-reliance and confidence among students.

(x) Teaching is a tri-polar process and its three poles are: teaching objectives, learning experiences and behaviour modifications.

(xi) Effective teaching provides feedback for both students and teachers.

(xii) Teaching is remedial and the teacher must solve the problems of students.

(xiii) Teaching is an observable, measurable and modifiable process. A teacher's behaviour can be observed and measured with the help of various supervisory techniques and their analysis.

(xiv) Teaching is a well-planned activity and teachers plan the objectives, methods of teaching and evaluation techniques in advance.

(xv) Teaching is a democratic process as it provides the learner with an opportunity to present his view.

Variables of teaching

Various types of variables are involved in the process of teaching. The teaching process takes place as a result of the activity of these variables as shown in Figure 4.4.

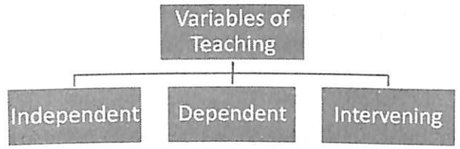


Fig. 4.4 Variables of Teaching

There are mainly three variables in the process of teaching. These are discussed below:

(i) **Independent variables:** In any process, the variable which is manipulated or the variable whose impact is observed on another variable is called 'independent variable'. In the teaching process, the teacher plays the role of an independent variable. He plans and organizes all activities of the classroom, and thus controls the process of teaching. The teacher is free to perform his teaching activities in order to bring about desirable outcomes from the learners. Hence, the teacher is more independent as compared to students. He has to diagnose the potential of the students and formulate educational objectives, accordingly. Thus, a teacher is a very important variable in the attainment of the goals of education.

(ii) **Dependent variables:** In any process, the variable on which the effect of an independent variable is studied is called a 'dependent variable'. In the teaching–learning process, learners or students are dependent variables as they depend upon the teacher. It is the student who is subjected to changes and development through the effort of the teacher. The student has to act according to the planning and organization of the teacher. Hence, the student is included in the category of dependent variables.

(iii) **Intervening variables:** A variable which falls in between independent and dependent variables and may influence dependent variables is called an 'intervening variable'. Intervening variables are also very important in the process of teaching as they help in smooth functioning of independent and dependent variables, for the realization of teaching objectives. In the process of teaching—learning, contents, methods of teaching, teaching environment, management of instructional material, learner's background, student's interest, attitude, and aptitude are some of the intervening variables. These variables are responsible for bringing about desirable interaction between the teacher and the students by producing proper teaching environment, teaching material and facilities, and creating appropriate learning conditions or situations.

Functions of variables

N.R. Swarup Saxena and S.C. Oberoi, in their book, *Technology of Teaching,* have given following functions of variables of teaching:

(i) Diagnostic function

The diagnostic function is the first aspect of teaching. In this aspect, the teacher decides about the pupils' entering behaviour and teaching objectives. Hence, the teacher considers only two things under the diagnostic function: (a) the pupil and (b) the content. The teacher, first of all, determines previous knowledge or basic behaviour

of the pupil. He then arranges the elements of the content to be taught in a sequence, by analysing them logically. In this way, the diagnostic function is the foundation of the remedial aspect of teaching. This function is performed in accordance with the pre-active phase. In this function, the teacher takes decisions after considering the following variables:

(a) ***Analysis of teaching problem:*** The first variable of diagnostic aspect is analysis of the teaching problem. Hence, the teacher should decide about the basic behaviour of pupils, related to the content, with far-sightedness and depth. It is also to be decided whether that content is according to their capacity or not. In other words, the teacher should take the decision concerning pupils and content so that the desired objectives may be attained. This decision proves fruitful for the remedial aspect or the interactive phase of teaching.

(b) ***Determining the entering behaviour of students:*** The second variable of the diagnostic aspect is to clearly determine the basic behaviour of students. After this, the teacher should present the new knowledge to the pupils. Its advantage is that after presenting the new knowledge, the information of changes in the behaviour of pupils will be easy to acquire. Hence, for determining the basic behaviour of pupils, the teacher should prepare and use evaluative questions, keeping in view the contents, which should be reliable and valid.

(c) ***Individual differences*:** The third variable of the diagnostic aspect is the consideration of individual differences of pupils. The principle of individual differences means that every pupil has different interests, attitudes, capacities, abilities and needs. Hence, keeping in view the capability differences of pupils, the teacher should perform the task of teaching.

(d) ***Task analysis*:** Task analysis is the fourth variable of the diagnostic aspect. The teacher should analyse learning activities related to the content. The success or failure of a lesson also depends on the task analysis.

(e) ***Analysis of content on the basics of types of learning:*** The last variable of the diagnostic aspect is analysis of the content, with regard to the type of learning. For this, the teacher should know the nature of learning. The should also know the tactics and principles to be used in various situations so that teaching becomes easy, clear, effective, understandable and scientific.

(ii) Remedial phase

In the remedial phase, an effort is made to bring desired changes in the behaviour of pupils. Hence, the teacher should make decisions regarding the use of teaching methods, strategies, tactics and mutual relationships between various variables, keeping in view individual differences of pupils. Assistance must be sought from action research in order to solve various problems which arise during the teaching. In this way, the teacher should manage the teaching variables in such a way that maximum teaching objectives are attained by deciding teaching techniques and tactics. This aspect has the following two sections:

(a) ***Selection of teaching strategies and tactics:*** The first section of teaching strategies and tactics is their selection. It should be remembered that the success of teaching and learning depends upon appropriate selection and use of teaching

strategies and tactics. Hence, the teacher should perform this important function in accordance with his ability and experience.

*(b) **Arrangement of feedback devices:*** The second important section of the remedial phase is the arrangement of feedback devices. Here, it is essential to state that feedback is the soul of successful teaching. Its reason is that feedback provides reinforcement to the pupil, who in turn, provides motivation and encouragement for learning. Hence, at the time of teaching, the teacher should provide necessary feedback for motivating and encouraging the pupils.

(iii) Evaluative phase

Evaluation is the third important variable of teaching. In this phase, the diagnostic aspect is evaluated. It should be remembered that the criterion of this evaluation is achievement of objectives. If the objectives are achieved, the remedy by the teacher is correct, otherwise it is defective. In other words, if the teaching objectives are not achieved, the teacher should not blame the pupil for his failure. He should change the variables of the diagnostic aspect so that the objectives may be achieved. Concerning this, it should be remembered that this aspect is in accordance with the post-active phase. This aspect has the following important parts:

*(a) **Construction of criterion test:*** The first part of the evaluation aspect is construction of the criterion test, which provides clear information regarding the changes brought in the behaviour of pupils by remedial teaching. The main characteristic of the criterion test is its objectivity. In other words, this test is reliable and valid. Hence, the teacher should construct the criterion test with great care.

*(b) **Evaluation of behavioural changes:*** The second part of the evaluation aspect is the evaluation of pupils' behavioural changes. The teacher should perform this function on the basis of criterion test.

*(c) **Diagnosis:*** The last part of the evaluation aspect is diagnosis. Diagnosis means to know the extent of success teaching by evaluation. If it is not successful, then decide upon the type of modification that should be brought about. If the teaching objectives have not been achieved as a result of their use; then planning, organization, leading and controlling of the teaching process should be repeated.

Phases of teaching

Teaching is a complex task and systematic planning is required to make this task successful and easy. This planning has to be done in a sequence of steps. These different steps are called phases of teaching. Different phases of teaching have different types of activities. There are three main phases of the process of teaching. These are as follows:

(i) Pre-active phase

This phase is also called the planning phase of teaching. As the name suggests, this phase is mainly concerned with the preparation for teaching. It involves all those activities that a teacher does before actually entering the classroom. The following activities can be included in this phase:

(a) Fixing of goals: For any type of teaching, first of all, the teacher decides goals, aims and objectives. After fixing the goals, the teacher decides on specific instructional objectives in the form of clearly defined behavioural terms. He also decides the level of sophistication or abstraction concerning the goals. While deciding on the objectives, the teacher also keeps in mind the characteristics and needs of the society.

(b) Deciding the subject: After deciding the objectives, the teacher has to decide on the subject for students. While deciding the subject matter, he teacher needs to consider the curriculum, behaviour of learners, their needs and motivation.

(c) Sequencing the elements of content for presentation: After deciding on the subject matter, the teacher has to arrange elements of the subject matter from logical and psychological viewpoint, so that this sequencing of the subject matter may prove helpful in the transfer of knowledge.

(d) Decision-making about teaching strategies: After arranging the subject matter, the teacher has to decide the methods and techniques to be employed. The content may be imparted through lectures, group discussions or self-instructional material. The teacher will select teaching strategies, keeping in mind the subject matter and the mental level of the pupils.

(e) Deployment of teaching strategies: Now the teacher has to decide as to what strategies will be used, and how and when they will be used in the classroom. The teacher shall also decide when and how questions should be asked.

(ii) Interactive phase

This is the second phase of teaching where the actual teaching–learning takes place. Whatever has been planned or decided at the planning stage is implemented at this stage. Here, the teacher and students are actually participating in the teaching–learning process. This phase includes all activities, behaviours or things done between the time the teacher enters the classroom and the time when lesson or subject content has been delivered by him. The interactive phase involves following activities:

(a) Perception: Appropriate perception on the part of the teacher as well as the students is a very essential element in the process of teaching. When the teacher enters the class, first she he tries to perceive the classroom's climate. Such perception helps in knowing about the pupils who can prove helpful and those who can create problems for him. The teacher tries to weigh herself himself and his/her abilities with respect to the class group. In the same way, students also perceive the personality, behaviour and capability of the teacher in order to seek desirable interaction in the classroom.

(b) Diagnosis of the learners: It is essential for the teacher to diagnose his/her abilities and behaviour and that of the students she he is going to teach. The diagnosis may be done by asking questions. The students also through verbal or non-verbal interaction get the opportunity to assess and diagnose the abilities, aptitude, interest and performance of their own responses. Thus, everyone in the classroom situation tries to see within her/his own self.

(c) Reaction or achievement: This is the period of actual interaction between the teacher and the students. This step involves the following activities:

- **Selection of stimuli:** The stimuli in the action or activity of teaching can be verbal as well as non-verbal.
- **Presentation of stimuli:** After selecting the proper stimuli, the teacher should now present that stimulus before the pupils.
- **Feedback and reinforcement:** Feedback and reinforcement are two of the most pivotal concepts in learning. Feedback involves providing learners with information about their responses, whereas reinforcement affects the tendency to make a specific response again.
- **Deployment of teaching strategies:** The strategies of reinforcing the students, of controlling their verbal and non-verbal behaviour, and of imparting subject matter systematically and effectively to the learner continues for most of the time while a teacher is teaching.

(iii) Post-active phase

The post-active phase of teaching is the simplest of all phases. It is nothing but the evaluation of operations involved in teaching. This phase comprises attempts made by teachers for determining the effectiveness of their teaching, and effectiveness of lessons taught by them. Practically, the data that is collected and examined is a combination of observation of classroom activities and outcome of students' written work. This phase involves the following operations:

(a) ***Defining the exact dimensions of teaching:*** The teacher compares the expected and the actual behavioural changes in course of her/his teaching, at the end of her/his session. The extent or quality of accomplishment of stipulated objectives helps the teacher to understand the effectiveness of teaching. It also helps in taking decisions about future improvement. Methods and strategies used by a teacher are said to be effective only if the teaching objectives have been achieved.

(b) ***Selecting appropriate testing devices and techniques:*** The teacher chooses appropriate testing techniques and evaluation tools to measure the various dimensions of behaviour. Thus, he notices the changes brought about by her/his teaching. The tests may be of many types, e.g., paper-pencil test, standardized tests, objective type tests, and teacher-made tests, etc. It helps the teacher to teach things better in the future and also the students to learn things better.

(c) ***Changing strategies in terms of evidences gathered:*** On the basis of assessment, a teacher comes to know about his performance. If the objectives have not been achieved, the teacher may find out the factors responsible for failure and also find the remedial techniques to be applied so that the objectives can be achieved.

Teaching machine

The pressure of the increasing population is affecting schools and teachers such that there is a higher demand of quality education and individual attention. To deal with the situation, various educationists are busy in finding the best solution for solving the problem of teaching. One of these solutions is a teaching machine, also called *programmed teaching*. *Teaching machine* is a mechanical or electronic device for self-teaching. Teaching machine is a device which is automatic in nature and is controlled by the user. It helps in presenting the information to the leaner and is also able to get her/his response. Teaching machine acts like teacher, as the name suggested, and, hence, after response from the learner it provides feedback about the correctness of the learner's response. The teaching machine presents the learner with a sequence of questions, problems, or instructions. The learner responds to each item, typically by pressing one of the several buttons provided to her/him. Teaching machines have been used in school systems and job-training programmes.

In classrooms, it is very difficult for a teacher to deal with individual differences as there are both slow and fast learners. Fast learners find the teacher slow, if she/he is teaching according to the speed of slow learners. Similarly, slow learners find the teacher too fast, if she/he is teaching according to the speed of fast learners. Teaching machine can solve the problem of individual differences as each student can learn according to his own rate. These machines are unique instructional aids because students remain active as they have to read, watch and respond, according to the content being taught. A teaching machine presents information in a carefully planned manner; generally in small steps that can be mastered easily. Mistakes are revealed immediately giving time for improvement. Subject matter presented in this way is called a programme, or programmed material.

We can, thus, define teaching machines as follows: 'A mechanical, electrical or other automatic device designed to teach students by presenting information in a planned sequence, questions based on the given information and providing an immediate response to his or her answer.'

American psychologist Ludy T. Benjamin defined teaching machine as follows: 'A teaching machine is an automatic or self-controlling device that (a) presents a unit of information, (b) provides some means for the learner to respond to information, and (c) provides feedback about the correctness of the learner's response.' This definition clears the concept of teaching machines. To understand more about teaching machines we have to go through its origin and evolution.

History of development of teaching machine

Experimentation in mechanized teaching began in the 19th century. Several kinds of devices were in use at the time of World War II. In the mid-1950s, psychologist B.F. Skinner devised programmed materials that led to the development of several kinds of teaching machines. By early 1980s, most of these machines had been replaced by computers. The use of computers for self-teaching is known as Computer-Assisted Instruction, or CAI.

However, the development of teaching machine began with the educational devices of the 19th century, through initial teaching machines of Sidney L. Pressey in the 1920s to the machine invented by B.F. Skinner in 1950s. However, pioneer work is considered to be done by Pressey and, thus, he is known as father of teaching machines. Pressey's machine was strongly influenced by Thorndike and his laws. In 1924, Pressey made a basic teaching machine appropriate for rote-and-drill learning. In 1926, he published the first paper by using a teaching machine, for use in schools and society. Pressey showed learning was facilitated by automated-instruction by providing immediate reinforcement, individual adjustment of pace and active responses. He had done impressive work in the world of education by providing information in a sequence and by immediate feedback, with active participation of

learner. However, at that time the world of education was not ready for this change as the study of human learning was dominated by teacher-oriented and theory-based learning.

As time passed, the use of such machines was emphasized by many educationists as well as psychologists. In 1950s, B.F. Skinner, a famous psychologist and a professor at Harvard University, invented the actual teaching machine. He came up with a box-like mechanical device that fed questions to students, rewarding correct answers with fresh academic material. Wrong answers simply repeated the old question. Skinner said, 'the student quickly learns to be right'. A number of teaching machines were developed after the work of Pressey and Skinner, which had tremendous effect on the process of learning. By the mid 1960s, it was possible to identify different types of teaching machines like the linear machine, which had content in a particular sequence. Another type of teaching machine was the adaptive machine in which each learner develops mastery of the content, depending upon its capability.

Thus, we can say that origin of teaching machine had a psychological basis. A number of teaching machines are in use nowadays. These are used by the teachers to assess the student's knowledge. They are very helpful for the teacher to increase the knowledge of individual differences and also to apprise them about the strong and weak points of their students. Teaching machines are specially used for small children as they are very successful in drilling practices.

Characteristics of teaching machine

The characteristics of teaching machine are as follows:

(i) A teaching machine not only presents information to the students but also elicit information from them.

(ii) It keeps record of student's response. This estimates how much they have learnt.

(iii) Teaching machine informs the people about their progress by showing correct and incorrect responses. This restricts cheating.

(iv) Teaching machine helps in solving the problems of teaching.

(v) Teaching machine controls the behaviour of students.

Constituent of teaching machines

Teaching machines are used to teach students in such a way that they are induced to engage in new forms of behaviour. It is not only a matter of teaching them what to do but also how to do it. There are different types of teaching machines, but following are the main components that are present in every type of teaching machine:

(i) **Content:** It forms the most important part of a teaching machine. Content is the information stored in a teaching machine, which is to be transferred to the learner in a particular manner. Content is organized on the principles of psychology. All necessary information regarding related subject or topics is included and divided into frames, which are arranged in a particular sequence.

(ii) **Medium of transformation:** The content prepared for a teaching machine is present in the form of programmed text, radio/TV programme or in the form of computer software. To transmit this information to students, a proper channel is required. This is known as the 'medium of transformation'. This medium could be printed words, audiovisual programme, computers or other likely devices. These mediums allow the students to learn at their own pace, as they proceed from frame to frame. They can take as much time as required, according to their learning/responding ability. Thus, mastery of content can be achieved by each and every student.

(iii) **Responding:** In each frame, there are some given questions in multiple choice format or others, depending on the type of teaching machine. Thus, after going through the content, students have to answer those questions and then only they are able to move to the next frame. Thus, response from a student tells us about what she/he has learnt with the help of a teaching machine.

(iv) **Feedback:** After response from students, correct feedback is given to them so that they are able to know what they have actually learnt. If the response is correct, they are moved to the next frame, but if the response is incorrect they are given the necessary information and made to read the content, after which they can move ahead. It is very important for students to know about their progress as it is considered a very important component of the teaching machine.

Types of teaching machines

Teaching machines can be of various types, but all of them work on the same principle. Some teaching machines are extremely simple and easy to prepare and handle, while some are complex and not easy to prepare. So we may broadly categorize them into the following types:

(i) **Simple teaching machines:** In simple teaching machines, a test sheet or a book has content and questions, along with answers. For example, after the necessary information, questions are given in the form of fill in the blanks and answers are given on some other page.

(ii) **Complex teaching machines:** In complex teaching machine, help of electronic devices like computers are taken. Here, frames are arranged in sequence and questions are of multiple choice types. The next question appears only when the user answers the previous one correctly. Otherwise, he is prompted to answer the same question again till he does it correctly.

Advantages of teaching machines

There are many advantages of using teaching machines. Some of them are as follows:

(i) **Individual differences:** Teaching machines allow individual learners to proceed at their own pace and also give them the opportunity to review their work.

(ii) **Immediate feedback:** They provide immediate feedback to learners.

(iii) **Self instruction:** If teacher is not present, teaching machines can serve the purpose and help students to continue with the learning process.

(iv) **Command on the subject:** They give the learner more control on the subject, as he/she can learn a lot from correct or incorrect answers.

(v) **Interactive:** Teaching machines normally interact directly and individually with each student and they never lose patience with students, even after a number of mistakes made by them.

(vi) **Active participation:** Teaching machines involve a lot of participation from learners, as a result of which they remain active, unlike traditional teaching.

(vii) **Not time bound:** Teaching machines can be used any time because they never get tired.

(viii) **Diagnosis of problem:** While using teaching machines, a learner get the correct answer immediately after responding to the question, so errors can be easily diagnosed.

(ix) **Motivation:** Immediate feedback helps students to know whether they are right or wrong, and if right they are motivated to continue successfully.

(x) **No cheating:** Copying and cheating is discouraged in this programme. Since students perform on their own, answers are not shown to them directly.

(xi) **For drilling:** It is very useful for the subjects where drills is required. Teaching machines are very useful for younger students who learn mostly through drills.

(xii) **Helpful for teachers:** Teaching machines saves the teacher from a lot of drudgery resulted from drilling and routine teaching. This helps them to utilize their energy and time saved by the machine for better and more creative type of activities and teaching.

Disadvantages of teaching machines

(i) **Time consuming:** It is very time consuming to prepare a teaching machine.

(iii) **Costly:** Teaching machines are very expensive. Hence, developing countries like India cannot afford to use them in their educational and training institutions, at reasonable scales.

(iii) **Difficult:** It is difficult to develop programmes for the machine.

(iv) **Not self-sufficient:** There are many things which students can learn only with the help of a teacher, so only teaching machines are not sufficient for learners.

(v) **Maintenance:** Maintenance of these machines is both difficult and costly.

(vi) **Boring:** If a lot of errors occur in answering the questions, students may get bored or demotivated. Moreover, readymade structure of programme often fails to create curiosity or stimulate the thinking ability of a learner.

(vii) **Lack of flexibility:** There is loss of human touch and lively interaction in the learning process organized by means of teaching machine. This leads to lack of flexibility and interest in the system and fails to promote effective learning.

4.3.1 Differences between Teaching and Instructions

Instructions are interaction between the teacher and the pupil, but it still has the ability to divert the pupils towards objectives. It is basically involves giving instructions as to what to do and how to do. The instructions should be followed strictly to reach the desired task or accomplish a task. The main difference between teaching and instruction is that the teaching includes instruction but the instruction does not include teaching. Hence, the teaching is instruction but the instruction is not teaching. In spite of this, all the three cognitive, affective and psychomotor aspects of the pupils can be developed by teaching, while by instructions only cognitive aspect can be developed. Hence, no instruction can replace the teaching. In short, instruction is that process which diverts the pupils towards the objectives of cognitive aspects.

Also, instruction is primarily concerned with the development of knowledge and understanding in the pupil about a thing, system or process. Imparting of knowledge and understand ing merely represents one of the several objectives which we want to achieve through teaching. Teaching is concerned with all the domains of pupil's behaviour, i.e., cognitive, conative and affective. Instruction is a part of teaching.

The distinction between teaching and instruction may be seen from another angle. The face to face interaction of the teacher and taught found in teaching is not so much essential in the process of instruction. In instruct ion, a teacher may be rep laced by the programmed material, computer teaching machine, radio and television etc. A teacher cannot be replaced by these aids. Of course, in teaching a teacher makes use of them. Thus instruction is one of the several modes of teaching. In education, teaching and instructions go hand-in-hand.

4.3.2 Conditioning and Training

Who, Whom, Why, Where, What, How and When of Teaching

A review of the definitions given above reveals that to play the role competently in teaching, a teacher is expected to understand the significance of the following:

1. Who is to teach. The teacher is to teach and herself/he must understand himself throughly — his/her strengths and weaknesses and strive to present a reasonably good model before the students.
2. Whom to teach. The child is tube taught. Therefore, a teacher should understand him thoroughly-his abilities, aptitudes, attitudes, manners and temperaments and accordingly cater to the individual differences of students.
3. Why to teach. The teacher should always keep in view that the aim of education is to develop harmonious personalities, who are culturally retined, emotionally stable, ethically sound, mentally alert, morally upright, physically strong, socially efficient and spiritually enlightened. The teacher should not forget even for a moment that the traditional 3 R's have been replaced by 7 R's, that is, reading, writing, arithmetic (representing various disciplines), rights, responsibilities, relationships and recreation.
4. Where to teach. The teacher ought not to visualise the school to be merely a place of imparting information but a place where women and men of tomorrow are trained to take their place as enlightened citizens in the society and contribute to national development.
5. What to teach. The teacher must have mastery over the subject she teaches.
6. How to teach. The teacher must use new teaching-learning technology to make her teaching effective and inspirational.
7. When to teach. Appropriate steps need to be taken by the teacher to develop motivation of the student in the entire work.

Check Your Progress

7. Mentions at least two assumptions of teaching?
8. What are the variables of teaching?
9. What is diagnostic function?
10. What is a teaching machine?

4.4 SUMMARY

In this unit, you have learnt that:

- Communication is a complex and ongoing process involving exchange of verbal and non-verbal messages.
- Newman and Summer defined communication as an exchange of facts, ideas, opinions or emotions between two or more persons.
- Communication has some basic characteristics, such as, purposeful, universal, interactive, imperfect, dependent, complex, and contextual.
- Communication skills can be used virtually in every field. Effective communication is important because it allows people to lead more satisfying lives.
- The process of communication consists of a message being sent and received. The effectiveness of communication can be estimated by the similarity between the message sent and the one received.
- The process of communication begins with finalization of the message to be conveyed.
- Once the appropriate channel is selected, the decoding stage of the message begins.
- On the basis of the feedback, the sender analyses how effective the message is. If there is no feedback, the sender would not be able to make sure that the message has been interpreted by the receiver.
- Competency is required at both the sender's and receiver's end in terms of communicating and receiving the desired information.
- Barriers to communication have made the process complex, difficult and frustrating.
- Barriers to communications range from simple distracting noises to complex psychological factors.
- People interpret message on the basis of their attitudes and values. If a message is adverse for the receiver, it will not be able to persuade him easily.
- Communication can take place between two or more individuals.
- The type of communication which is broad and involves ways to communicate with masses is called mass communication.
- Every type of communication is unique and it makes everyone special and unique.
- Teaching is more complex, wide and comprehensive in comparison to all these four terms. It should not be confused with conditioning, training, instruction and indoctrination.
- In any process, the variable which is manipulated or the variable whose impact is observed on another variable is called 'independent variable'. In the process of teaching, the teacher plays the role of an independent variable.

4.5 KEY TERMS

- **Message:** It is a key idea, thought, opinion, feeling, knowledge or information, which sender wants to communicate.
- **Sender:** A sender is a person who initiates communication by making use of language or symbols to convey the message.
- **Encoding:** In order to convey what the information means to the receiver, the sender uses the process of encoding.
- **Decoding:** It is the process a receiver interprets the information that comes from the sender.

4.6 ANSWERS TO 'CHECK YOUR PROGRESS'

1. According to Merrihus, 'Communication is a process of mutual exchange of thoughts, ideas, facts and emotions.'
2. Encoding is a process of translating an information into a format which can be understood by the receiver.
3. According to the principle of mastry of language verbal communication through use of language is the most effective ways of communication. A sender or source of communication should use the language which is easy for the receiver to understand. In a classroom, the teacher should be fluent in the language which the students understand; only then it will be possible to convey the message to students.
4. Some major barriers of communication are lack of common language, semantic barrier, poor listening, poor vocabulary, noise, time, distance, emotional barriers and attitude and values.
5. Upward communication happens when the message is initiated by subordinates and is received by superiors.
6. Verbal and non-verbal communication between students and teacher in the class is called classroom communications.
7. Of the many assumptions of teaching, it is expected to:
   (i) facilitate student learning (ii) the act of teaching is a complex process that is influenced by a field of forces, of which teachers can be aware only in part and which they can only partially control.
8. The variables of teaching are (i) independent variables (ii) dependent variables (iii) intervening variables
9. The first aspect of teaching is diagnostic function wherein the teacher decides about the pupils' entering behaviour and teaching objectives. The teacher considers only two things under the diagnostic function: (a) the pupil and (b) the content.
10. Teaching machine is a device which is automatic in nature and is controlled by the user. It helps in presenting the information to the leaner and is also able to get his response. Teaching machine acts like teacher, as the name suggested, and hence after response from the learner it provides feedback about the correctness of the learner's response.

4.7 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What do you understand by the concept of communication? What are its characteristics?
2. Briefly discuss the functions of variables in teaching?
3. What are the differences between instruction and teaching?
4. How can barriers in communication affect the teaching-learning process?
5. Discuss the modalities of teaching. Also explain the functions of varibles.

Long-Answer Questions

1. Explain the cycle of communication.
2. Discuss the phases of teaching.
3. Why is good classroom communication important. Give your views.
4. Discuss the effectiveness of teaching machine.

4.8 FURTHER READING

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UNIT 5 INSTRUCTIONAL TECHNOLOGY

Structure

5.0 Introduction
5.1 Unit Objectives
5.2 Programmed Learning: Concept
  5.2.1 Principles
  5.2.2 Steps
5.3 Types of Programmed Instruction
  5.3.1 Types of Programming
5.4 Development of Programmed Learning Material (PLM)
5.5 Summary
5.6 Key Terms
5.7 Answers to 'Check Your Progress'
5.8 Questions and Exercises
5.9 Further Reading

5.0 INTRODUCTION

Instructional technology in education is the 'theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning', according to the Association for Educational Communications and Technology's (AECT) Definitions and Terminology Committee. Instructional technology is often considered a part of educational technology but their usage has changed over the years. Instructional technology covers the processes and systems of learning and instruction, while educational technology includes other systems used in the process of developing human capability. Razavi (2005) is of the opinion that educational technology covers instructional technology. It includes instructional technology and field study in human teaching and learning. Hence, educational technology covers a wider spectrum than instructional technology. Instructional technology has two signification sections—teaching technology and learning technology. In the education industry, the term instructional technology is frequently used interchangeably with educational technology.

In this unit you will learn how programmes with instructions have been created for self-learning and self-monitoring.

5.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Explain the concept of programmed learning
- Discuss the principles of programmed learning
- Describe programmed instructions and its types
- Analyse the development of PLM

NOTES

5.2 PROGRAMMED LEARNING: CONCEPT

The concept of programmed learning or programmed instruction is one of the important innovations in the teaching-learning process. Programmed instruction is a carefully specified, systematically planned, empirically established, skilfully arranged and effectively controlled self-instructional technique for providing individualized instruction or learning experiences to the learner. The subject matter or learning experience is logically sequenced into small segments. The learning experience is self- corrective. It is an application of the principles of behavioural sciences and technology in the field of education. The concept of programmed learner emphasises the interaction between the learner and the programme. English authors prefer to use the term programmed learning. On the other hand, American writers prefer the use of programmed instruction.

It is held by some educators that 'Gita' is the first example of programmed learning. They also maintain that the programmed text of the Gita has several ingredients of programming: initial behaviour, small steps, active participation, terminal behaviour, immediate feedback and self- evaluation by the learner.

Several educators regard Socrates as one of the earliest programmers who developed a programme in geometry. This was recorded by Plato in the dialogue Menu. Socrates guided his followers to knowledge by conducting them conversationally along a path from fact to fact and insight to insight.

Programmed learning as technological revolution in education

Programmed learning emerged in the beginning of the 20th century from the efforts of American psychologists. E.L. Thorndike (1874-1949) was the first psychologist whose findings bear direct relevance to programming. Other important psychologists who have made significant contribution in the field are Sidney L. Pressy, Robert M. Gagne, Robert Mager and B.F. Skinner.

Programmed learning is related with the 'law of effect' as explained by Thorndike. Sidney L. Pressey, a psychologist of Ohio State University, is credited for developing in the middle 1920's practical machines which could teach as well as test. The teaching machines as developed by Pressey present a series of questions to a student and inform him immediately whether his response is right or wrong.

In 1943, Skinner and two of his colleagues started programming by teaching a pigeon to roll a small bowling ball by operant conditioning. By 1954, Skinner and James G. Holland devised the auto-instructional methods which have served the present generation as the basis for present work in programmed instruction. In Skinnerian programmed instruction, whether mechanised or otherwise the learner is initially asked questions which he can easily answer correctly without any previous study of the particular lesson. The learner is taught by the sequence of questions. He is asked more and more as the lesson proceeds in very small steps.

In 1955, Norman A. Crowder developed what he calls 'automatic tutoring by intrinsic programming' as against 'extrinsic programming' developed by Skinner.

NOTES

Robert Mager (1958) gave a new concept known as 'Learner controlled Instruction' which is a kind of Socratic dialogue in reverse, in which the learner led the instructor. The instructor remained silent until the learner himself stimulated the instructor with questions that suggested the needed illustrations, demonstrations, practice or some other help.

Stoluron, at Illinois, had been developing a process which should provide for greater individualization by measuring needs and devel-oping programmes that require a computer to assist instruction.

In 1962, T.F. Gilbert gave formalized expression of his technology of education called Mathetics. In 1962, Pennington and Slack expressed detailed methods of preparing lessons from mathetic principles.

Rothkopf in 1965 suggested a term 'mathemagenics.' Mathemagenic behaviour involves three characteristic activities: (i) the transformation of a nominal stimulus into a effective stimulus (which is to take place within the organism); (ii) some form of elaboration (which, for instance, may take the form of echoic responses); (iii) process exemplified by problem solving and inductive reasoning. These activities must take place before any learning begins. Rothkopf points out that as the learner reads a text, he experiments with and internalizes various kind of mathemagenic behaviours. The test shows that learners encounter, sort out and extinguish those behaviours which were not effective.

In 1965, Lawrence Stolurow brought the idea of computer-assisted instruction, (CAI).

Definitions of programmed instruction

(1) *Arthur A. Luonsdaine* (1964): An instructional programme is a vehicle which generates an essentially reproducible sequence of instructional events and accepts responsibility for efficiently accomplishing a specified change from a given range of initial competencies or behavioural tendencies to a specified or terminal range of competencies or behavioural tendencies.

(2) *Edgar Dale:* Programmed learning is a systematic, step by step, self-instructional programme aimed to ensure the learning of stated behaviour.

(3) *Gulati and Gulati:* Programmed learning as popularly understood is a method of giving individual instruction in which the student is active and proceeds at his own pace and is provided with immediate knowledge of results. The teacher is not physically present. The programmer, while developing programmed material has to follow the laws of behaviour and validate his strategy in terms of student learning.

(4) *G.O.M. Leith* (1966): Programme is a sequence of small steps of instructional material (called frames), most of which require a response to be made by completing a blank space in a sentence. To ensure that expected responses are given, a system of cueing is applied, and each response is verified by the provision of immediate knowledge of results. Such a sequence is intended to be worked at the learner's own pace as individual self-instruction.

(5) *Jacobs and Others* (1966): Self-instructional programmes are educational materials from which the students learn. These pro-grammes can be used with

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many types of students and subject-matter either by themselves, hence, the name "self-instruction" or in combination with other instructional techniques.

(6) *James E. Espich and Bill William:* Programmed instruction is a planned sequence of experiences, leading to proficiency in terms of stimulus response relationship.

(7) *Kampfer:* It is a device which presents an exercise or a problem to a student, inducing him to respond, and revealing to him whether or not his response is correct.

(8) *K.O. May* (1965): Educational programming is the scheduling and control of student behaviour in the learning process.

(9) *R.C. Das* (1993: This is a method of individualised instruction, where each individual learns by himself at his own rate. Programmed learning consists of elements of new knowledge called steps which are arranged in a sequence in such a way that a student can easily learn by himself.

(10) *Smith and Moore* (962): Programmed instruction is the process of arranging the material to be learned into a series of sequential steps. Usually if moves the student from a familiar background into a complex and new set of concepts, principles and understanding.

(11) *Susan Markc* (1969): It is a method of designing a reproduc-ible sequence of instructional events to produce a measurable and consistent effect on the behaviours of each and every acceptable student.

Edward L. Thorndike (1912) described the fundamental idea of programmed self-instructional materials in these words, 'If by a miracle of mechanical ingenuity, a book can be so arranged that only to him who had done what was directed on page one, would page two become visible and so on, much that now requires personal instruction could be managed by print.' This 'miracle' later on became a reality.

In programmed learning, it is said that the most efficient, pleasant and permanent learning takes place when the student proceeds through a course by a large number of small, and easy-to-take steps Wilbur L. Schramm (1962) lists the essential elements of programmed instruction as: (a) an ordered sequence of stimulus items, (b) to each of which a student responds in some specific way, (c) his responses being reinforced by immediate knowledge of results, (d) so that he moves by small steps, (e) therefore, making few errors and practicing mostly correct responses, (f) from what he knows by a process of successively closer approximation, toward what he is supposed to learn from the programme.

Teaching instruction and programmed instruction: According to Edgar Dale, "'Teaching' is a broad, vague, ill-defined term and 'instruction' is a purposeful, orderly, controlled sequenc-ing of experience to reach a specified goal. 'Programmed instruction' is a sub-head under instruction and represents a more rigorous attempt to develop a mastery, over specified goals to secure 'insured' learning."

Programmed learning and programmed instruction: These two terms PL and PI have been used interchangeably in educational literature. The English educators prefer the use of programmed learning (PL) and the American writers on the other hand use the term programmed instruction (PI).

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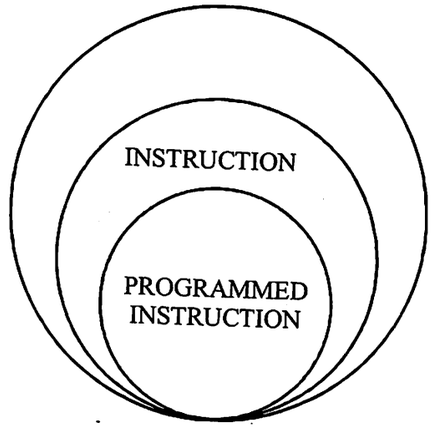


Fig. 5.1 Teaching instruction and programmed instruction

Programmed instruction and educational technology: Programmed instruction is a part and not the whole of educational technology. It is a strategy of teaching and learning and self-instructional texts or audio-tutors. It may be treated as 'software' approach for instructional technology. Software approach refers to application of teaching learning principles to the deliberate and direct shaping of behaviour. Programmed learning is different from teaching machines and devices usually termed as hardware educational technology.

Essence of a programme: The essence of programme lies in writing it in such a way that every student will eventually be able to complete it without a mistake. The key to the programme is to ensure that the student tries the correct answer. The material presented to the student may be in the form of a book or simple machine or a complicated computer. In every case, the student gives his response and then checks the correctness of the response.

Salient characteristics of programmed learning

1. The objectives underlying the programme are defined in explicit and operational terms. This makes the terminal behaviour desired to be built up through the programme measurable and observable.
2. Assumptions about the learner are clearly stated and put in definite terms in a programmed learning type of situation. These assumptions may relate to the particular level of reading competence of the learner, his command of vocabulary and his background in the subject matter.
3. The learner is made to respond actively by asking to fill in the blank, count the number of coins in a row or complete a series of numbers. For doing it correctly the student receives reinforcement and establishes a pattern of stimulus-response interaction.
4. In a programmed learning situation, the learner progresses at his own pace.
5. A programmed test provides for immediate feedback information. This is based on the theory of reinforcement which emphasises that the learner learns from the sequence of responding and not from the making of response itself.

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6. Programmed instruction takes care of the fact that there are even differences in the rate at which an individual learner learns various kinds of subject matter.
7. Programmed learning enhances the capacity of the learner to discriminate or to generalise by frequent application and, thus, offers the learner an interesting challenging project.
8. In programme learning a learner moves in every specific way as opposed to traditional procedures of teaching where the learner moves in very general way.
9. Programmed learning provides for constant evaluation through the record of learner's responses. The quality of the programme can be improved through checking the number of errors at each step and the learner's progress can be evaluated by looking into various types of responses produced by the learner.
10. Programmed learning is based strictly on the behaviouristic principles of psychology. A fair amount of stress is laid on the examination and development of understanding through the handling of various cues in the learning process.

Programmed learning may be explained in brief as under:

(a) The learner is presented with a stimulus which gives him information, demands on his response, or does both.

(b) These is a continual necessity for the learner to utilise his information in making some response.

(c) After responding, he is presented with information (feedback), which enables him to ascertain the appropriateness of response.

Need for programmed instruction: Technology or automation is the only solution to the challenge posed by 'knowledge explosion' and 'population explosion'. The present era, therefore, is passing through a period of a silent revolution in the field of education. Programmed instruction is an innovative step in this direction towards automation and individualisation of instruction.

Table 5.1 Programmed Instruction and Traditional Method

Programmed Instruction	*Traditional Method*
1. It is an individualised technique of instruction.	1. It is a group technique.
2. It is based on the teaching-principles that have been known for years.	2. It becomes difficult to apply teaching principles in crowded classrooms.
3. It presents the instructional matter step by step in logical order.	3. It presents the instructional matter as a whole.
4. The size of the unit of information presented to the pupil is a small bit of information.	4. The unit is a lengthy one. There is no provision for response from the students in the form of answers to questions.
5. Immediate feedback is given to the instructor.	5. The learner does not get immediate feedback.
6. Objectives are defined very clearly in operational terms.	6. Objectives are not well-defined and are usually vague.
7. The programmer prepares his programme with care and precision.	7. Little preparation is made.
8. Programme is prepared in such a way that the student automatically participates actively by making responses continually.'	8. The student usually remains a passive listener and the teacher himself does the summarising and reviewing.
9. A programme is developed empirically through a series of tryouts and refined gradually. Effective sequences of frames are retained and ineffective ones discarded.	9. It is usually found to be very difficult to modify traditional instruction on the basis of student reaction.

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5.2.1 Principles

Researchers have evolved five principles of programmed learning. According to behaviourist psychology, the effects of learning can be measured through a number of responses a learner makes under controlled conditions. Feedback is essential to correct responses to reinforce such response, and it was thought that such a process would require individual learning. The principles are mentioned below:

Principle of small steps: It is shown by experiments that even the dullest students can learn as effectively as the brightest students if the subject matter is presented to them in suitable small steps. When we divide the task to be learnt into very small steps, and ask the students to learn only one step at a time, then probably all the students will be able to learn one small step at a time and sequentially learn all the steps. It is a difficult task to climb a mountain but once steps are built even a child can climb the mountain very easily. This is known as the 'principle of small steps'.

Principle of activity responding: Tht second psychological principle is that the students learn better and faster when they are actively participating in the teaching-learning process. In our classroom teaching the teachers do ask a few questions and the students respond. But it is not possible for the teachers to ask all the students to respond at each small step. A teaching machine text or a programmed text contains a large number of questions—one question at each small step and the students respond actively. The principle of active responding is used for the programmes. The teaching machines and programmes have proved to be superior because they provide opportunity to every learner to respond at every small step.

Principle of reinforcement: Every response even approximately correct must be reinforced immediately. Delayed reinforcement fails to work. This is possible only when a teacher has to teach only one student at a time. The most ideal situation is when the teacher can cater to the needs of his students individually. But in classroom teaching this is hardly possible. No teacher, however efficient and sincere, can reinforce each correct response of each of his students as soon as it is made in a classroom situation where he has to teach about 4/50 students. The teaching machines and the programmes do the job more efficiently.

Principle of self-pacing: The programmed instruction is based on the basic assumption that learning take place effectively if the learner is allowed to learn at his own pace. Therefore, a good programme of the material always takes care of the principle of self-pacing. A learner moves from one frame to another according to his own speed of learning.

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Principle of student-evaluation or student testing: Continuous evaluation of the student and the learning process leads to better teaching-learning. In the programmed instruction, the learner has to leave the record of his responses because he is required to write a response for each frame on response sheet. This detailed record helps in revising the programme.

Edward F.O. classifies principles of programmed instruction in two broad categories mandatory and optional.

(i) Mandatory principles: These include:

(a) Principle of objective specification

(b) Principle of empirical testing

It includes: (a) Individual try-out (b) Small group try-out (c) Field try-out

(c) Self-pacing

(ii) Optional principles

4. Overt responding
5. Immediate feedback
6. Small step size

Rule for the art of programming

I. Klaus has summed up twelve rules of the art of programming and building instructional frames:

1. ***Active responding:*** *A* learner learns from making a response and not from hearing or seeing it.
2. ***Proper cueing:*** The provision of proper cueing is the main difference between a test question and an auto-instructional frame.
3. ***Appropriate context:*** This is the kind of stimuli that will be capable of evoking the desired response at some time in future.
4. ***Small steps:*** It is very desirable that there should be as many small steps as possible.
5. ***Sequence of topics:*** The topics of the subject-matter should be carefully sequenced so as to provide adequate motivation.
6. ***Frequent repetition:*** Cues associated should be changed and frequent repetition provided in frames.
7. ***Knowledge of subject-matter and technical accuracy:*** *A* sound knowledge of these is very necessary for preparing a suitable and effective programme.
8. ***Lecturing to be avoided:*** The learner should be helped to learn and this is possible in case we provide facts to the learner.
9. ***Evoking a relative response:*** Right kind of illustration should be used for evoking a response.
10. ***Providing cues in adequate number:*** Excess of cues will prevent the learner from making his own generalisations and discovering principles.

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11. ***Not assuming too much knowledge:*** The programmer should not assume too much knowledge on the part of the learner.
12. ***Presenting of facts in frames:*** Only one fact should be presented in one frame.

Effects of programmed learning on the teaching process

1. Tutorial experiences are provided for individual learners on a large scale whereby the learner may proceed at his own.
2. Programmed instruction can exercise control on homework and individual study.
3. Programmed instruction can enable the learner to catch up the loss of absence from school.
4. Programmed instruction provides a technological solution to the problem of individual differences. Programmed instructional materials enable the teacher to gear up his presentation to what he senses is the average, too slow for the bright student and too fast for the slow one.
5. The availability of instructional material of a programme and its powerful tools make the teacher much more a professional man than he now is.
6. By interpreting the feedback obtained through oral questions and discussions in the class, the teacher can intelligently vary the flow of information or further instruction.
7. A basic feature of teaching machines is 'immediate knowledge of results' followed by immediate correction of errors and rewards for correct answers. It has been established by research that more frequent the rewards, the better the learner assimilates the mate-rial.
8. It eliminates cheating because the learner has to gain nothing by it.
9. The students like the use of machines than studying a textbook.
10. It eliminates the influence of teacher variable in research.
11. Immediate scoring promotes the learning process.
12. The technique is valuable in giving tests which can automat-ically be scored.

Professor John Blyth and John Jacobson describe the following uses of programming:

1. No class time is wasted on drill.
2. Examination of student's work on the programme can enable us to prepare for a class period with prior knowledge of the points that is needed for further clarification.
3. No time is wasted to locate and correct misconceptions the students may have through unchecked practices.
4. Classroom efficiency may increase by about 30 per cent. More material can be covered in less time.
5. Individual differences may be reduced to a considerable extent.
6. Difficulties of the students can be easily diagnosed.
7. Individual and class differences can be easily located.
8. There can be a great increase in interest and improvement in morals.

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Merits of programmed learning

Programmed learning is considered to be a more efficient method of teaching-learning. Its superiority is well-established over the traditional methods of teaching-learning. It is increasingly being used in the advanced countries of the world. It is realised that the programmed instruction has potentialities to revolutionise the theory and practice of teaching. Following are the main merits of programmed learning.

1. A well-programmed instruction is a great thrust in the direction of individualised instruction, as it is tailed to the needs of the individual learner in the class.
2. It permits individual learner to progress at his own speed. An intelligent learner needs no longer to be bored or allowed to lose interest on account of his slow progress of other learners of the class. He can make progress as he is able.
3. Since a programme requires continuous response from the learner, it overcomes the inertia and passivity on the part of the learner.
4. The teacher can give explanation in the classroom if the error is common or he may arrange individual conferences on specific points.
5. A well-programmed instruction is a great thrust in the direction of individualised instruction as it is tailored to cater to the needs of the individual students of the class.
6. Learning material in a programmed instruction is presented in such a way that learning becomes an interesting game and the learner is motivated to meet the challenges set by his own capabilities.
7. Programmes are developed by experts. They are empirically tested and modified till they are standardised. A number of learners can use a single good programme and thus save textbooks.
8. In programmed instruction the learner is immediately reinforced to correct his response and this reinforcement sustains the motivation of the learner.
9. The self-instructional technique presents material in which its complexity is simplified through the analysis of the subject- matter into small and more easily assimilated segments of information.
10. The introduction of programmed instruction is of great significance for developing countries which are set on the path of educating millions of learners and are short of teachers.
11. Good teachers are freed from the boredom of routine classroom teaching and are in a position to devote more time to more creative activities.
12. The programmed instruction has been used more successfully in teaching the discernment of the logic of various disciplines and inspiring students to creative thinking and judgment.
13. Certain motor skills and intellectual abilities normally taught by frequent drills and rote memorisation can be very efficiently taught by self-instructional devices.
14. Self-instructional materials have been found to be very useful in the West in revolutionising the social setting of the classroom. Problems of discipline have been solved and a new hope for eliminating emotional and social problems has been generated.
15. Programmed instruction enables the teacher to diagnose the problems of the individual learner.
16. The introduction of programmed instruction is very helpful in certain situations where human instructors are not easily available in the required number, for instance small schools in the isolated or hill areas.

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Limitations of programmed materials

Programmed materials have been severely criticised as a threat to replacing the teacher.

It is also argued that there is too much emphasis in learning facts and very little emphasis on the mastery of principles and concepts.

Some critics of programmed instruction maintain that the user of a programme does not know where he is headed to.

They also point out that the learners are not aware of the organisation and programmed instruction is unrelated to other aspects of instruction.

It is also argued that the programmed instruction material is very costly and only rich nations can afford it.

It is also stated that the development and use of programmed instructional material require expert knowledgeand training. An average teacher finds it very difficult to make use of this device.

Theory of programmed learning

It is true that Sidney Pressj' had actually designed several self-testing devices in the 1920's but it was Professor Skinner who in his famous article "Science of Learning and Art of Teaching" published in 1945, pleaded for the application of knowledge derived from behavioural psychology to classroom procedures and sug-gested automated teaching devices as a means of doing so. He emphasised that to acquire or learn behaviour a student must engage in behaviour. It is not enough to attract students attention but, more important, the attention of students should actually be directed to what the teacher wants them to learn. Reinforcement, i.e., the knowledge of the correctness of the learning behaviour, must be immediate and frequent; the knowledge that student is right is sufficient reinforcement to encourage him to learn more. Skinner also pointed out that 'holding students together for instructional purposes in a class is probably the greatest source of inefficiency in education'. In his view, if a certain behaviour is expected of a student to alter the learning experience, he must be encouraged to perform in that manner during the learning session itself. A student learns better and is motivated to learn more if the step taken by him is confirmed to be correct, that is to say if the learnt behaviour has been reinforced. It is easier to learn one step at a time. If the behaviour to be learnt is analysed into parts which are properly spaced and arranged in logical sequence, it would be easier to learn the whole desired behaviour by learning one step at a time. There should be few errors in the learning process so that the student practices correct responses and these responses are reinforced immediately by the knowledge of results so that he makes closer approximation to the responses which are the desired outcomes.

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Can programmed learning replace the teacher?

Programme learning cannot replace the teacher. Any innovation in the school programmes and practices must remain in the hands of the teachers. The radio and T.V. did not displace the teacher. Similar is the case with programmed instruction. It is upto the enlightened teachers to take up the challenging task of preparing programmes. We have got a wide market. The programmes can be sold all over the country. A student who is convinced that he can learn better, achieve more with the help of this programme, will definitely prefer instead of buy this programme to buying a textbook. By taking up this challenging task we will not only help the cause of education, help our fellow teachers by setting them free from the routine task of information, giving help to the students to achieve more, but we will be helping ourselves also.

It may also be remembered that these gadgets can be used mainly in the cognitive field and possibly in the psychomotor field to develop certain abilities and skills of the student as an individual. A teacher is something more than all these gadgets put together. He has to bring about socialization of the individual; he has to promote socially desirable attitudes and interests and mould the personality of the students. The effective domain is almost reserved for his care. At present the teacher is not able to devote his energy and time to this important task as most of his time and energy is consumed by his routine job as an information giver. We always talk of education for three 'H's'—the head, the hand and the heart. But it has almost remained a mere slogan. Programmed learning, teaching machines and other gadgets will set teacher free from routine work. These are labour-saving devices for the teacher so that he may function more effectively in a field of his own choice.

Technique involved in programmed instruction can be used in teaching different subjects. Teaching of mathematics, science, social studies and elements of Indian languages can be done effectively with the help of this new technique. The teacher has to formulate objectives of teaching a particular subject, undertake content analysis of the subject matter in the light of objectives, frame a chain of questions which will lead the pupils in the direction of the objective and present the questions to his pupils who are expected to try their hand at answering the questions independently. The teacher will have to play the role of a friend, guide and philosopher in the class when the pupils are engaged in solving the riddle and at the same time acquiring knowledge or skill. The question of class discipline may not arise as the pupils will be found busy doing the task assigned to them by the teacher. The teacher will have to do remedial or corrective teaching as the weakness of his pupils will be located in the very act of learning. The pupil will also undergo a process of self-evaluation as he completes his work.

Role of the teacher in the changed context of programmed learning may be stated as under:

1. As an adviser in helping students in the selection of programme learning material
2. As a discussion leader for focussing the attention of the learners on important points
3. As a guide to clarify doubts and elaborate on various points asked by the learner
4. As an evaluator of the learning outcomes
5. As a consultant to the various agencies engaged in production of programmed material

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Programmed learning approach in normal classroom teaching

The programmed learning approach can be adopted in normal class- room teaching in the following ways:

1. A teacher can make use of the principles of programmed learning such as active responding, minimal errors and confirmation while teaching various subjects in the conventional manner.
2. A teacher can define behavioural objectives in advance of teaching.
3. A teacher can validate the instructional systems of a class in terms of the performance of learners immediately after teaching is over.
4. A teacher can regulate questions and answers. The answer of a learner can be immediately reinforced by informing or telling whether it is correct or incorrect.
5. A teacher can plan the entire instructional programme of a class-room and can treat the terminal behaviour, the pre- requisite skills and content analysis in advance.

Komoski (1960) has observed, 'Two thousand years ago the world's first public administrator, a gentleman by the name Quintilian, wrote what might be called a handbook for teachers.' In it he has one bit of advice which will serve as an excellent starting point for a discussion of programmed learning and its potential uses. His advice is: 'Do not neglect the individual student. He should be questioned and praised.'

5.2.2 Steps

It should be noted that education is a process with two dimensions: instructions and learning. The former is the job of the teacher, the latter of the student. It is for the teacher to plan out the steps of teaching keeping in view the capacity of the student. So, small step-by-step instructions with feedback from the students should be taken. The subject matter of the programme and the instructions should be presented by breaking them into small steps in a logical sequence. Information delivered in small proportions, meaning small units, would ensure smooth and easy translation and understanding of the subject matter. The small steps stress the gradual nature of the increase in complexity and the smoothness of the transition from one item to the next. Information grows in depth. Changes occur in quality and quantity. Programmed instruction is a process of constructing sequences of instructional material in a way that the rate and depth of learning are maximised, understanding is fostered and the motivation of the student is enhanced. A programmed instructional sequence takes into consideration the initial behaviour of the learner with which it starts and the terminal subject matter competence which the learner is to achieve. The instructor, too, gets immediate feedback.

5.3 TYPES OF PROGRAMMED INSTRUCTION

Programmed instruction (PI) is still in its infancy in India. Programmed instruction as an optional or elective paper has been included at the B.Ed./M.Ed. level in a few universities in India. It also form a part of the paper of Educational Technology/

Check Your Progress

1. What is programme learning?
2. What is mathemagenic behaviour?
3. What are the essential elements of programmed instructions according to Schramm?
4. What is a software approach?
5. Identify the principles of programmed learning.
6. What is the role of a teacher in programmed learning?

Educa-tional Innovation. However, as regards its classroom use, it may be observed that it is almost nil. As far back as in 1966, the Kothari Commission suggested to develop programmed material in different subjects to test the suitability of the technique in Indian conditions. An association of programmed instruction has been formed to coordinate the research being done at different centres in the country. The association also disseminates the information on new studies through its journal issued from time to time. The National Council of Educational Research and Technology has also done some work in the field. In spite of all these efforts, it may be stated that the application of programmed instruction has not yet made an appreciable impact on our classroom teaching. Our methods of teaching still remain traditional, by and large-Following are the important factors which stand in the way of introducing programmed instruction in Indian schools:

1. Resistance to change.
2. Lack of good programmes and programmers.
3. Lack of facilities

5.3.1 Types of Programming

As a result of experimental studies and research, following types of programmed instruction have emerged.

1. Linear or extrinsic programming
2. Branching or intrinsic programming
3. Mathetics programming
4. Rules system of programming
5. Computer assisted instruction
6. Learner controlled instruction

The first three styles—linear, branching and mathetics are the basic formats. The rules system represents the deductive and inductive approach to teaching. The other two types, computer-assisted instruction (CAI) and learner controlled instruction (LCI) are not the basic format of programming. They are, infact, the ways and means of providing instruction. Here we have taken up only the basic type of programming.

(i) Linear programming

B.F. Skinner is the originator of linear programming. It is also called a single-track programme. According to Skinner, a creature, a bird or a human being can be led to a desired behaviour by means of a carefully constructed programme consisting of small steps leading logically through the subject- matter from topic to topic, provided each step is reinforced by some kind of favourable experi-ence or reward. The increments in information which the learner is expected to absorb are small. The favourable experience, or response increases the probability of the same response, to occur again in the future. The process of rewarding the correct response to a stimulus increases the general tendency to give a response

The process may be graphically illustrated as under:

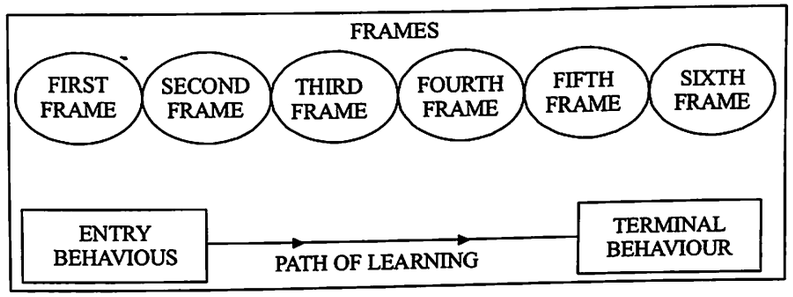


Fig. 5.2 Arrangement of Frames in Linear Programming

As shown in the figure, the sequence of frames and path of learning in the programmed learning is systematic and linear. That is why, this type of programming is referred to as linear programming. Hence, all the learners have to proceed through the same frames and in the same order.

In a linear programme, learner's responses are controlled externally by the programmer sitting at a distant place. Hence linear programming is also termed as extrinsic programming. In branching programming, learner's response is controlled by internally learner himself. It is, therefore, also called intrinsic programming.

Principles of linear programming

1. Principle of small steps.
2. Principle of active responding.
3. Principle of minimum erros.
4. Principle of knowledge of results.

Chief characteristics of linear programming

1. A linear programme is a single track or a straight line programme.
2. In this programme, learning material is presented into a series of small steps (frames).
3. Every learner follows the same path in a linear programme.
4. In lineai- programming, the content is broken into small units ranging from just one word to as many as 40 or 50 in length.
5. In a linear programme, the learner is given a small programme, the learner is given a small amount of information.
6. The sequence of steps remains unchanged.
7. The learner is expected to compose his own answer to each question.
8. The learner is expected to respond actively to each step or frame.
9. The responses of the learner get immediate reinforcement.
10. Linear Programming provides for self pacing i.e. one can learn according to one's own speed.
11. Linear programming moves slowly but steadily in leading a learner from initial to terminal behaviour.

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12. Each of the unit constitutes a frame.
13. In a linear programme, the programmer controls the response of the learner.
14. In a linear programme, the learners learns by avoiding the error.

Merits of linear programming

1. Immediate knowledge of results acts as a great motivator and releases anxiety and tension.
2. The smallness of the frames brings the sub-goals within the reach of the learner and thereby facilitates secondary reinforcement.
3. Repetition strengthens the responses and ensures learning.
4. Easy nature of the programme provides 'success experience' to the learner.

Limitations of linear programming

1. In linear programming, the learning process becomes quite dull on account of the following reasons (a) subject matter is broken into very small pieces (b) responding is quite mechanical and restrictive and (c) the learning process is quite slow.
2. The use of linear programmer is limited to some subjects and topics.
3. Linear programming cramps the imagination of the learner and initiative for creative, integrative and judgement learning.
4. Linear programming encourages guessing.
5. Linear programming does not develop the discriminating power of the students.

(ii) Branching or intrinsic programming

Branching or intrinsic programming was developed by Norman A. Crowder (1954) an American technician. According to Crowder, branching or intrinsic programme is one which adopts to the needs of the learners without the medium of any extrinsic device such as a computer. It is not controlled extrinsically by the programmer.

Norman A. Crowder was a technician who was working in the United States Air Force. He was faced with the problem of efficiency of Vocational training. His programme is based on intution. His approach at the most is practical. This type of programme employs multiple choice response patterns. The learner is required to select one right answer out of several responses presented to him.

Characteristics of a branching programme

1. A frame may contain two or three related ideas or related sequences.
2. Each frame is of relatively bigger size as compared with the linear type.
3. With a view to answering the question, the learner has to arrive at an answer by setting the relationship between one idea and the other and by filling up the gaps not fully covered in the frame. Only then he can select the correct alternative from the multiple choice.
4. The learner moves forward if his responses are correct but is diverted or branched to one or more remedial frames if he does not give the correct response.

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5. Frames explain the matter afresh when response is not correct. The frames ask the learner questions to elicit the right answer and reveal his previous mistakes. The learner, then, returns to the original frame.
6. The cycle goes on till the learner passes through the whole instructional material at his own pace.
7. Branching programme contains multiple choice of items where the learner selects response whereas in linear programmes or Skinnerian style the response are constructed rather than selected.
8. In a branching programme, all learners do not follow the frame route. Rather, the route depends on the response made by the learner. Thus, learners branch according to their responses.

Assumptions of Branching

1. Learning takes place better, if the subject-matter is presented in its totality.
2. Learning takes place better, if the subject-matter is presented in the form of meaningful components or units.
3. Wrong answers do not necessarily hinder the learning of a correct answer.
4. Multiple choice items help more in the learning process.
5. It is based on the possibility of detecting and correcting errors.
6. Basic learning takes place during the learners exposure to the new material.
7. Learning takes place better if the learner is allowed sufficient freedom to take decisions for adopting the instruction to his needs.

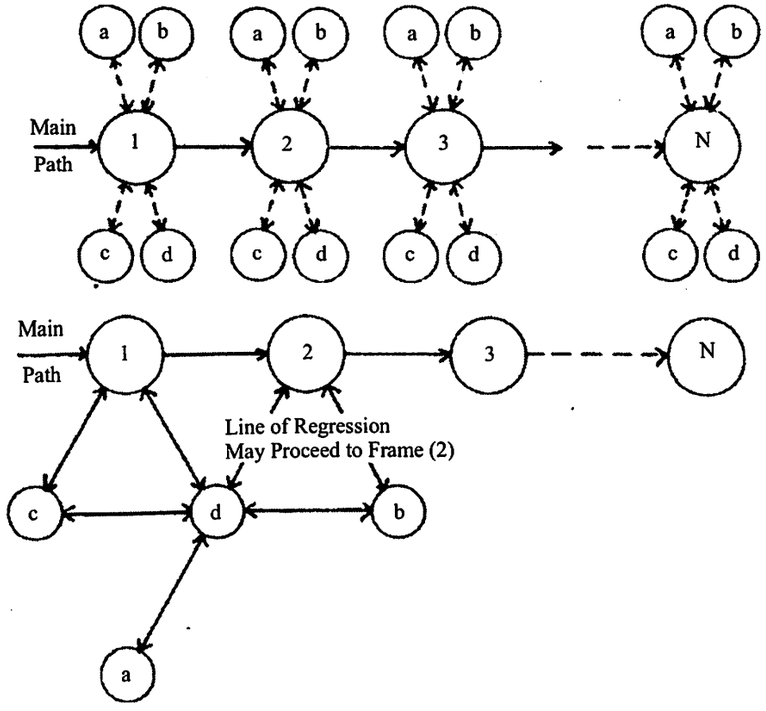


Fig. 5.3 Main Path and Branching in Branching Programme

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Merits and advantages of a branching programme

1. Big size of a frame as well as the branching minimises unnecessary repetitions and responding, thus reducing the amount of learning time and fatigue.
2. The pitfalls and consequences of erroneous logic are usually explained in the remedial frames so that the learner not only gets the correct response but also understands why some other response is hot correct.
3. Instead of simple response it provides alternatives in the form of multiple choice.
4. Through its broad frames, branching programme provides for more freedom to respond and scope of choosing one's own path of 'earning according to one's need. Thus it helps in maintaining the nterest and initiative of the learner.
5. Branching programme is helpful in the development of the power of discrimination of the learner.
6. Branching programme helps in the development of creativity and problem-solving ability.
7. Branching is most useful in the areas beyond facts, definitions and basic skills.
8. The frames being of larger size contain a good deal of information and this may enable the programmer to enrich his style and expand his ideas.
9. The programmed material in branching programme may be employed in the form of programmed text or teaching machines. The material when presented in a book form takes the form of a 'scrambled book.'

Limitations of branching programming

1. The multiple choice questions provided in this programming may lead to guesswork on the part of the learner and he may not understand the subject matter of the frame.
2. The setting of appropriate multiple choice questions suiting to the entire material of the frames proves a difficult task.
3. No branching method can provide infinite branching to take care of all possible needs of every individual student.
4. The cost of branching programme is very high when compared with traditional teaching approaches.
5. The branching programme is not suitable for small children as 'hey are unable to express the symbolism.
6. The programme needs revision after every two years.
7. It is difficult to cover the entire subject-matter.
8. The diagnostic questions framed by the programmer may or may not suit the needs of the individual learner.
9. The programme cannot shape the behaviour of the learner.

Backward branching. Backward branching is based on the principle of'repeating the missed frames'. As shown in the diagram the learner of frame No. 1 of the main stream goes to frame No. 2 of the main stream only if he makes a correct choice. But

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if he makes a wrong choice, he is led to a remedial frame wherein he is given some more help in understanding the concept and in solving the solution by a better logic. He will be then directed to the original frame No. 1 so that he can read it again and answer it correctly in the light of the remedial materials he has received. So the learner who has committed error goes though the same frame twice (once before the remedial material and once after the reme-dial material).

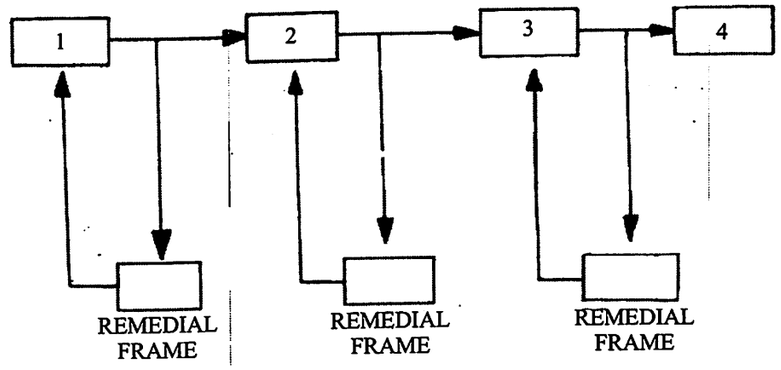


Fig. 5.4 Backward Branching

Forward branching. In the forward branching, whether the learner makes a wrong choice or correct choice, he will always be going t'o new pages, thus physically progressing from page to page.

The learner making a correct choice will go directly to the. next frame of the main stream. But the learner who had made a wrong choice goes to a remedial frame wherein his mistake is fully explained, probably followed by another parallel question, from which he goes to the next frame of the main stream. So, even though he is wrong, physically he does not return to the original frame but progresses to a remedial frame which is more logical and simpler and then joins the main stream.

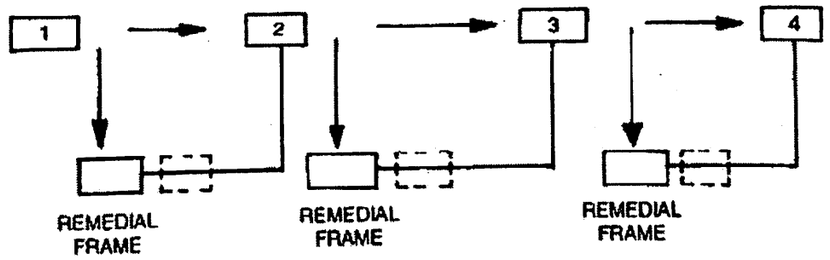


Fig. 5.5 Forward Branching

Forwardness or backwardness of a programme. We as programmers depend first on our previous knowledge and experience and if necessary let it be checked by a set of learners. This forwardness or backwardness of a programme is quite arbitrary but the only thing is that as long as we are successful in explaining the errors and consequently successful in inhibiting them, we are quite free to choose any of them.

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Use of linear-cum-branching programme. The style of programming depends on the topic programmed, population for which it is programmed and other multi-factors. Whether we are going to present it in a branching or a linear style, requiring overt to covert responses, as long as it aims at taking the student through an elaborate and systematic path of self-learning and testing processes, thus facilitating the student to achieve the terminal goals, it serves its functions. It is very difficult to adhere rigidly to one type of presentation. A combination of the two may prove more useful. Thus an item on the main stream of the programme may follow branching pattern, but some of the remedial sequences may be linear to guide the learner in short steps through material which he found difficult.

A linear teaching machine cannot easily be adapted to take branching sequence. This type of machine is made cheat-proof by its technical construction. Its frame size is usually too small to accommodate a large frame accompanied by multiple choice answer.

A branching machine on the other hand is more flexible.

The choice of linear or branching is left open to the free choice of the programmer according to his aims, resources and the character-istics of students with whom he is working. In general, a linear programme will be of great use in the following situations.

1. When the programmer thinks that the learners cannot digest a large chunk of material, but may need small steps.
2. When the programmer thinks that the concepts or skills involved in the programme are of such importance that their complete mastery must be ensured by the trainees;
3. When the population of trainees has more or less the same entering behaviour, i.e., there is more homogeneity among the trainees.
4. When it is proved empirically (by way of individual and group try-out) that the very nature of the content demands linear format, e.g., in a subject which is entirely hierarchical.

(iii) Mathetics

Thomas P. Gilbert (1962) is the originator of the concept of mathetics. According to him 'mathetics is the systematic application of reinforcement theory to the analysis and construction of complex behaviour repertories usually known as subject-matter mastery, knowledge and skills. Mathetics, if applied diligently, produces materials that exceed the efficiency of lessons produced by any known method.'

The word mathetics is derived from the Greek work 'mathein' which means to learn.

There are two distinctive types of programming techniques: one stressing the subject-matter and its treatment and the other stressing the behaviour. Mathetics falls under the second category.

Mathetics is eclective in nature but it is unique in application. It analyses the deficiencies and tries to make them up. The success of task analysis depends to a great extent on the adequacy and reliability of data. The term task analysis suggests

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the breaking down of the task into its constituent parts and involves detailed listing of component behavioural elements of a job or task. A task analysis is really an inventory to which knowledge, skills and attitudes are identified and isolated with a view to ultimately synthesising them into a hierarchical organisation relevant to the writing of learning prescription.

The aims of task analysis may be stated as under:

1. Description of the task which the learner has to learn.
2. Isolation of the required behaviour.
3. Identification of the conditions under which the behaviour occurs.
4. Determination and generalisation of a criterion of acceptable performance.

Task analysis is of three types (i) Analysis of topic, (ii) Analysis of the job, and (iii) Analysis of the skills.

Main features of mathetics programming

1. Like any other well-thought out instructional plan, a mathet-ics programme begins with a detailed analysis of what is to be taught.
2. In mathetics, an exercise is the technical unit *of* learning instead of a frame as in linear or branching programming.
3. No restriction is put on the size of an exercise.
4. The size of the exercise is determined by how big a step a Learner can reasonably take at a moment.
5. Each exercise assumes the reinforcement value of accomplish-ment. In a mathetics style, a different strategy of reinforcement i.e., other than the 'knowledge' of results, which is the main source of reinforcement in the linear programming is employed.
6. This programme makes use of the techniques of retrogressive or backward chaining.
7. Learning prescription involves three principles: (i) Principle of discrimination, (ii) Principle of chaining, and (iii) Principle of gen-eralisation.

The underlying rationale of mathetics programme is that closer the learner is to reinforcement when he is taught, the more effective the reinforcement becomes. The reinforcement, in this case, is the completion of the task.

Discrimination. Discrimination implies making a different label or name for a non-example which shares some properties with previous examples. The three examples are reproduced from Gil-bert.

(i) A colour band can have 10 colours.

Read thoroughly this list twice. Learn the number for which each colour stands.

A five-dollar bill is *green.*

One *brown* Penny.

A *red* heart has two parts.

A *white* cat has nine lives.

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Three *orange* oranges.

Seven *purple* seas.

A poor legged *yellow* dog.

Blue tail-fly has six legs.

An eighty-years-old man has *grey* hair.

(ii) List the number for which each colour stands.

Red (heart), *White* (cat), *Purple* (seas), *Brown* (penny), *Green* (bill), *Grey* (hair), *Blue* (tail-fly), *Orange* (oranges), *Yellow* (dog).

(iii) List the number for which colour stands Black—Brown— Grey—Green—White—Purple—Red—Orange—Blue.

There is a correct response for each stimulus situation but there is no particular order in which these responses have to occur.

Chain. In a chain there is a fixed sequence of responses to be emitted, e.g., steps in division, order of words in a sentence, opening or closing a bottle or tying or untying a shoe lace. Frames that follow indicate the chaining process.

In chains responses must occur in a fairly regular order. Each response produces some change in the stimulus situation that sets the occasion for the next responses to occur.

Retrogressive chaining: It is based on the basis tha;t closer the student to the reinforcement when he is being taught, the more effective is the reinforcement. In this case the reinforcement is the completion of the task. Each time the student performs, he completes the task.

The six-frame sequence that follows Retrogressive Chaining to teach a mathetical procedure is designed to teach one something by making one apply the knowledge one already has plus new infor-mation that this programme will supply.

Areas of behaviour most suited for shaping through mathetics programming

1. Behaviour requiring chain
2. Skills and complex behaviour repertoirs
3. Behaviour which shows dependence of one on the other

Merits

1. It is a job and task-oriented programme.
2. Results can be linked to concrete goals which we intend to achieve through a mathetics programme.
3. Its stress on learner-success at 90/90 criterion level of mastery motivates the learner.
4. It utilises the principle of backward chaining.

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5. It is relevant, significant, meaningful and valid in the eyes of the learner and the programmer.
6. It can be applied to a wide range of subject-matter but it specifically suits the teaching of skills where the main objective is transfer of training of skills from one situation to another.

Drawbacks of mathetics programming

1. It is very technical in nature and as such demands a lot of skill, training and labour on the part of the programmer.
2. It is not suitable for learning the material of all subjects. Only concrete material and subject material involving psycho- motor skills can be gainfully programmed by means of Mathetics.
3. This programme makes inadequate provision for individual differences. All learners have to learn the same way.
4. It provides very little freedom to the learners as usually construct responses are required.
5. The learner encounters difficulty in constructing the last response or mastery response in the beginning.
6. Mathetics cannot be used for factual content.
7. Mathetics cannot be used for higher cognitive and affective learning objectives.
8. Mathetics does not provide any remedial help for the weaknesses and difficulties of learners.
9. Mathetics is not based on any sound learning theory.

An Example of Mathetics Programme

Do whatever the programme asks. If you come to the blank, (...) put the correct word, number, symbol or whatever in the blank.

When a response is required, you will find the correct response on the lower part of the page. Check your answer, then go on to the next.

Programme Page 1

1. To find the square of a two digit number ending in 3.
   (a) Multiply the number by its first digit and add to it the product of the two digits.
   (b) Write 9 to the right of the result. No. response in required.

Programme Page 2

2. To find the square of 16.
   (a) Multiply the first digit (1) by the next consecutive number (2). 2
   (b) Write 56 to the right of (2). 2 56
   (c) Square of 16 is 256.
   No response required:

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Programme Page 3

3. To find the square of 17.
   (a) Multiply the first digit (1) by the next higher consecutive number (2). 2
   In the Mathetics Style, an exercise in the technical unit of learning instead of a frame in the linear programming.
   (b) Write 89 to the right of the result. 2 89
   (c) The square of 17 is 289.

Programme Page 4

4. To find the square of 26.
   (a) Multiply the first digit (2) by the next higher consecutive number. 3
   (b) Write 76 to the right of the result.
   (c) The square of 26 is 676. 6 76

Programme Page 5

5. To find the square of 21
   (a) Multiply ... by ...
   (b) Write ... to the ... of
   (c) The square of 21 is ..
      (i) Multiply 2 by 2
      (ii) Write 41 to the htof4
      (iii) The square of 21 is 441.

Programme Page 6

6. What is the square of:
   (a) 25? (a) 625.
   (b) 35? *(b)* 1225,

Programme Page 7

Here each frame includes the entire process, part of it supplied by the programmer and part of it supplied by the student. Each frame of the programme increases the student's share and decreases the amount supplied by the programmer.

Mastery Frame or Demonstration—In the above model, the first frame in mathetics is mastery frame which is called demonstration. The mastery step completes the task or procedure to be learned.

Teaching Frames—Mastery frame is followed by teaching frames where prompts are used to assist the learner to give the desired response.

Testing Frames—The testing frames in mathetics are called release where no prompts are provided. In the above model, the, last frame is the release frame.

Table 5.2 A Comparison of Programming Models

Item /Concept	*Branching*	*Linear*	*Mathetics*
1. Proponent	Norman A. Crowder(1954)	B.F. Skinner (1954)	Thomas B. Gilbert (1962)
2. Learning theory theories of learning.	Configuration conditioning	Operant theory	Connectionist
3. Application	Remedial to the difficulties of the learner	Modification of behaviour	Mastery of the subject-matter
4. Stage utility	Very effective at higher classes	Very effective at the secondary stage	Useful for higher classes
5. Reinforcement	Ultimate correctness of response	Correctness of response	Task completion
6. Unit of presentation	The frame	The frame	The operant
7. Size of the step	Larger	Small	As big as possible
8. Number of steps	Small	Large	As few as possible
9. Response	Multiple-choice	Constructed	Written or by performing task on stimulator
10. Rate of error	Varies according to programme usually 20%	5%	Some deliberate errors written into the programme to sharpen discrimination
11. Subject-matter suitability	Where broader concept or large pieces of information can be given	Subject which can be divided into small	Suited to Kinesthetic or discrimination pieces skills
12. Paper programme	Scrambled text	Linear book	Programmed instructional package
13. Machine design	Film programme	Simple linear	Stimulation devices
14. Paper cost	Relatively expensive	Lower cost	High cost
15. Machine cost	More than linear	Cheap	Varies according to the type of stimulator

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Check Your Progress

7. What is the other name for linear programming?
8. Who developed intrinsic programme?
9. What is backward branching?
10. Define the concept of mathetic as described by Gilbert.
11. Name the areas best suited for mathetics.

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5.4 DEVELOPMENT OF PROGRAMMED LEARNING MATERIAL (PLM)

The development of a programme is a very challenging, highly dynamic and time-consuming exercise. The programmer must have a scientific temper to study all aspects of behaviour, its various forms and levels. In writing a programme, a programmer has to be very pragmatic and skilful.

Important stages in programming. These are as given below:

I. Preparation

II. Constructing or writing the plan

III. Try-out and revision

IV. Evaluation

(1) Preparation

Peter Pipe suggests the following points before getting down to details:

1. Be prepared to find that preparation accounts for at least 25 per cent of your total time.
2. Do not bother about attaining perfection in one step before you begin the next.
3. There is no substitute for hard work. Preparation requires hard work.
4. Do not rely on memory to keep track of new ideas.

Steps at the preparation stage: These are listed below:

(1) Selection of a topic (unit).

(2) Writing assumptions about learners.

(3) Defining objectives in behavioural terms.

(4) Writing the entry behaviour of the learners.

(5) Developing specific outline of content.

(6) Preparing a criterion test\

1. ***Selection of a topic to be programmed.*** Following points should be taken into consideration:

(1) Is no programme already available on the topic?

(2) Does it allow to develop a simple, logical and systematic programme?

(3) Does it meet the requirements of the curriculum?

(4) Will it help in lessening the burden of the teacher?

(5) Will the expenses and labour involved in the programme be justifiable in terms of the gains.

(6) The topic for a programme should be selected from the programmer's own field of study. In the selection of the unit, the following yardsticks must be applied:

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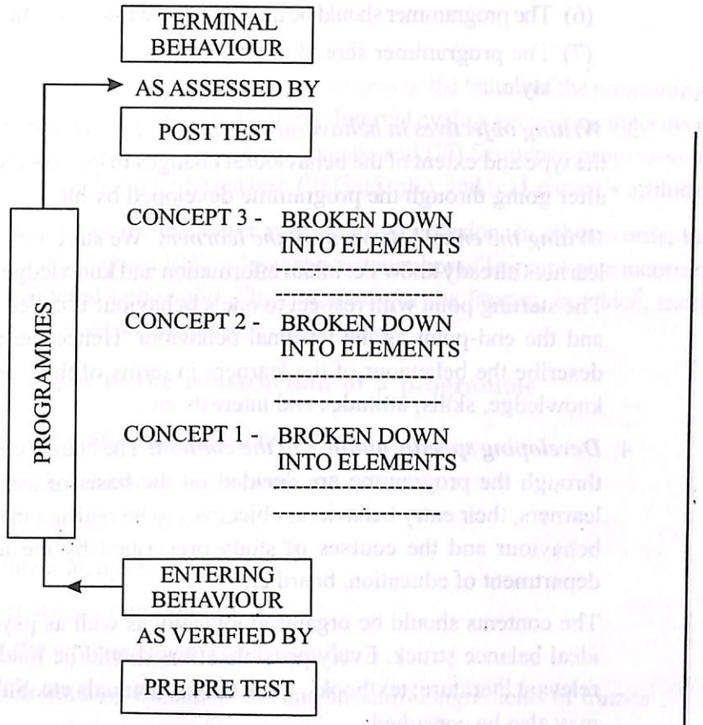


Fig. 5.6 *Flow Chart indicating the Structure of the Programme*

(a) Is this something the learner must know?

(b) Is it difficult for him to find a good explanation from other sources?

(7) The subject-matter should be simple.

(8) The beginner programmer should select short units which he can use, evaluate and revise in a fairly brief period.

(9) The programmer should select a unit from a field which is usually considered a stumbling block to the learner. Of course, the criterion of ease and length should not be ignored.

(10) Special needs of the students should also be taken into consideration.

2. ***Writing assumptions about the learners:*** The programme is meant for the learners. Therefore, a programmer should be fully aware of the characteristics of the learners. Following points should be taken note of:

(1) The programmer must list basic assumptions about learners in very objective and concrete terms.

(2) He should describe the age and gender, skills, interests and ambitions of the learners.

(3) The ability of the learners may be judged from scores obtained on intelligence, aptitude and achievement test, etc.

(4) The programmer should know the socio-economic status of the learner.

(5) The programmer should know the educational level of the parents of the learner.

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(6) The programmer should be quite frank in writing assump-tions about learners.

(7) The programmer should not be concerned about its length or its literary style.

3. ***Writing objectives in behavioural terms:*** The programmer should state clearly the type and extent of the behavioural changes to be expected from the learners after going through the programme developed by him.

Writing the entry behaviour of the learners. We start with some-thing that the learners already know i.e. initial information and knowledge possessed by them. The starting point with respect to one's behaviour is called his entry behaviour and the end-point as the terminal behaviour. Hence the programmer has to describe the behaviour of the learners in terms of the base i.e. pre-requisite knowledge, skills, attitudes and interests etc.

4. ***Developing specific outlines of the content:*** The course contents to be covered through the programme are decided on the basis of assumptions about the learners, their entry behaviour, objectives to be realised in the form of terminal behaviour and the courses of study prescribed by the authorities—school, department of education, board etc.

The contents should be organised logically as well as psychologically and an ideal balance struck. Every possible effort should be made to go through the relevant literature: textbooks, work books, manuals etc. Subject matter experts may also be consulted.

5. ***Preparing a criterion test:*** The criterion test is designed to ascertain the effectiveness of a programme by measuring the learner's performance on clearly defined educational tasks. Through the criterion test, the terminal behaviour of the learner reached after the completion of the unit of a programme is assessed for ascertaining the extent to which the desired objectives have been realised. A sort of standard to test the programme is set up. In the light of this standard or criterion test, evaluation is made whenever needed.

(2) Construction or developmental phase (writing of the programme)

The writing of the programme is carried under the following heads:

(1) Writing the draft frames in a sequence i.e. from simple to complex.

(2) Editing the draft frames by a team of experts usually consisting of (i) Subject matter expert, (ii) A skilled writer, and (iii) The programmer.

(3) Try-out and revision

This step is carried on as under:

(i) Giving the programme to a few individual learners, finding out their reactions and making necessary changes in the light of reactions.

(ii) Trying out the programme on a group of learners at a few places and making changes on" the basis of reactions.

(iii) Trying out the programme in the field.

(4) Evaluation

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Evaluation enables the programmer to judge the success or the failure of the programme. It is done on internal as well as external criteria. Internal evaluation is done in terms of three aspects (i) Error rate, (ii) Programme density, and (iii) Sequence progres-sion. External measures include (a) Criterion test, (b) Gain ratio, and (c) Learner's attitude.

The programmer or the evaluator applies 90-90 criterion. In other words, the statements or the frames where 10% or less than that number of learners give incorrect responses are considered to be valid. The statements or the frames, in which, more than 10% learners give wrong responses, are deleted.

Specific skills needed in the construction of a programme

Skills needed for the planning stage. These are:

(a) Skill in writing behavioural objectives

(b) Skill in defining entry behaviour

(c) Skill in content analysis

(d) Skill in preparing a criterion test.

Skills needed at the writing stage. These include:

(i) Skill in differentiating the functional and structural ingredients of frames

(ii) Skill in using primes and prompts

(iii) Skill in ordering and arranging frames in a proper sequence

Skills needed at revising, editing and testing

(a) Linguistic skill

(b) Editing skill

(c) Skill in individual testing which requires establishing a rapport

(d) Skill in obtaining evidence about the worthwhileness of the programme

Use of primes, prompts and cues in programming

For helping the learner make the correct response and eliminate error, he is assisted" in the form of 'primes' and 'prompts' in the introductory frames. Priming is introduced in a frame through a process of copying the response given in the stimulus material: For example.

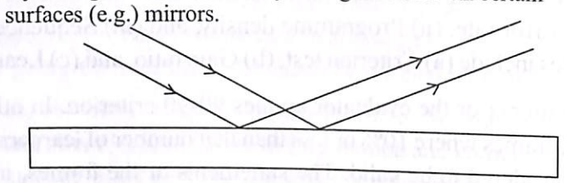
> All elements are made up of small particles of matter called 'atoms'.
>
> The smallest particle of copper is called—
>
> Response: atom

A prompt, on the other hand, does not indicate to the learner the correct response in the stimulus itself. A hint or cue is provided to help the learner to choose the correct response. According to Skinner, prompts can be classified into two categories: (i) Formal prompt, (ii) Thematic prompt.

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A formal prompt provides an indication of the form of response. For example:

One of the optical phenomena which can be studied by using rays of light is reflection. Rays of light bounce off certain surfaces (e.g.) mirrors.



The phenomenon that you see in the figures is called re—
Response: reflection

Thematic prompt depends on the general properties of the prompting stimulus. It gives a hint. For example:

The ray that is incident on a reflecting surface is called 'incident' ray. The ray which is reflected by the mirror is called.. ray

Response reflected

It may be kept in view that the primes and prompts should be provided only in the initial steps and thereafter gradually with-drawn.

Illustrative programmes in school subjects programme
No 1 Civics, Class X

Introduction. This is a programme meant for you for the study of salient features of the Constitution of India.

In this programme you will find paragraphs which are called frames. Study each frame carefully and write down what is required. Answers are given at the end. After stating your answers, check them. If your answer is wrong or you do not understand anything, you can again go back to the frame. It is not a test but instead it is a self-study programme.

Frame 1

The Constituent Assembly of India was set up under the provis-ions of the Cabinet Mission Plan to frame the Constitution of India which was formally adopted on 26th Nov. 1949 and came into force on 26th January 1950. It took nearly three years to complete the work.

(i) What was the work assigned to Constituent Assembly?
(ii) Under whose provision was it formed?
(iii) When did our Constitution come into force?
(iv) When was it adopted?
(v) How much time did Constituent Assembly take to complete its work?

Frame 2

The Preamble of the Constitution has a great significance but is not a part of the Constitution. The Constitution was framed by the people of India through their

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representatives. It stresses che fact that the reign- of the land lies with the people of Indm.

(a) Is the Preamble a part of the Constitution?
(b) By whom was the Constitution framed?
(c) In whose hands does the reign of law of India lie?

Frame 3

The Preamble of our Constitution is as under:

We the people of India having solemnly resolved to constitute India into a Sovereign Socialist Secular Democratic Republic and to secure to all its citizens:

Justice, social, economic and political;

Liberty of thought, expression, belief, faith and worship;

Equality of status and of opportunity; and to promote them all;

Fraternity assuring the dignity of the individual and the unity and integrity of the Nation.

In our Constituent Assembly this twenty-sixth day of November, 1949, do hereby adopt, enact and give to ourselves this Constitution.

Note—Three new terms—Socialist, Secular and Integrity were added to the original text of the Pi eamble when it was amended in 1976 with the 42nd Amendment.

The Preamble stresses the democratic basis of the Constitution by stating that the People of India gave to themselves this Consti-tution. It also states objectives like justice, liberty, equality and fraternity.

(i) Who has given the Constitution of India?
(ii) What kind of justice has been ensured by the Preamble?
(iii) What type of Republic is to be constituted?
(iv) What kind of equality has been given to its citizen?
(v) How many types of liberty can a citizen enjoy?

Frame 4

Another important feature of the Preamble is that the people themselves adopted and enacted the Constitution. Thus, the repre-sentatives of the people frame the laws of the country and they have the power to change or amend the Constitution.

(a) Who frames the laws of the country?
(b) Who has the power to amend the Constitution?

Frame 5

The Constitution of India has many unique features which distinguish it from Constitutions of other countries. The framers of the Constitution freely borrowed ideas but took care to adapt these to the needs of the country.

The Constitution makes India a Sovereign, Socialist Secular, Democratic Republic. The word Sovereign means that India is completely free from external control. No

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outside power has the right to interfere either in her internal administration or direct her in the conduct of her foreign policy.

This was emphasised to ensure that India was no longer 'dependent' on the British Empire as she had been before Indian Independence Act 1947 or 'dominion' as she had been from 15th August, 1947 to 26th January 1950.

(a) What kind of status did India enjoy during 15th August 1947 to 26th January 1950?

(b) Was India sovereign between 15th August 1947 to 26th January 1950?

(c) What is the meaning of the word 'sovereign"?

(d) Does the Constitution of India has unique features?

(e) Did the framers of the Constitution borrow ideas?

Answers

1. (i) To frame the Constitution of India.
   (ii) Provisions of the Cabinet Mission Plan. (iii) 26th January 1950. (iv) 26th November 1949. (v) Nearly 3 years.
2. (a) No.
   (b) People of India through their representatives.
   (c) People of India.
3. (i) People of India.
   (ii) Social, economic and political.
   (iii) Sovereign Socialism Secular Democratic.
   (iv) Equality of status.
   (v) Five.
4. (a) Representatives of the people. (6) Representatives of the people.
5. *(a)* Dominion.
   (b) No.
   (c) India is completely free from external control.
   (d)Yes.
   (e) Yes.

Programme No. 2 Biology Taxonomic Categories Class XI

Introduction. (On the pattern of "rogi'ammf No. 1.)

Frame 1

All round ourselves, we see several kinds of animals and plants. They all exhibit various degrees of differences and resemblances. One feels the necessity of arranging these innumerable living things in some sequence. The method of arranging and grouping of animals and plants in various divisions is called as classification.

(i) All animals exhibit various degrees of..... and.....

(ii) The organisms can be better studied if they are.....in some.....sequence.

(ii) .....is the method by which various organisms are grouped.

Answers

(i) Differences, resemblances,

(ii) Arranged,

(iii) Classification.

Frame 2

The organisms are classified according to certain characteristics. First they are placed into the bigger groups like all the organisms of world have been put into 2 groups, namely plants and animals. These groups are further divided and sub-divided into various smaller groups.

All these different groups are called categories. These categories have been given different names at different stages, e.g., Kingdom, Phylum, Class, Order, etc.

(i) The assemblage of organisms in the groups according to certain characteristics is said to form a .

(ii) _____and_____are the names of the categories.

Answers

(i) Category,

(ii) Kingdom, Phylum, Class, Order (Any of these).

Frame 3

In classification, these categories are placed in a definite sequence. Some categories are higher than others, e.g., Kingdom is a higher category than Phylum. Each higher category contains all the lower categories.

1. Is there any definite sequence to arrange the category?
2. Which category will be studied first while classifying any organism? (higher, lower)
3. Study the sequence of categories given below:

   Kingdom, Phylum, Class.

   (a) If Kingdom is the highest category, which will be the lowest?
   (b) Category Phylum will contain category ... also.
   (c) Will category Kingdom contain all the classes?

Answers

1. Yes;
2. Higher;
3. (a) Class, *(b)* Class, (c) Yes.

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Frame 4

The putting up of the taxonomic categories in a logical sequence is called a hierarchy. Study carefully the list of categories given below in a descending order i.e., first one is the highest category.

Kingdom, Phylum, Class, Order. Family Genus, Species. This sequence forms a hierarchy.

(i) If various categories are arranged in a sequence, it forms a.....

(ii) Write whether the sequence of the categories given forms a hierarchy.

Order, Kingdom, Phylum, Genus, Class.

(iii) Make a hierarchy of the categories given above.

(iv) From the hierarchy made by you, answer the following:

(a) .....is the highest category.

(b) .....is the lowest category.

Answers

(i) Hierarchy, (ii) No, (iii) Kingdom, Phylum, Class, Order, Genus, (iv) (a) Kingdom; *(b)* Genus.

Programme No. 3 Class X History Topic: Hinduism

Introduction

Frame 1

Hinduism is considered to be the oldest religions of the world. It made significant progress during the Golden Age of the Guptas. (i) Which is considered to be the oldest religion of the world? (ii) During which age Hinduism made a great progress?

Answers

(i) Hinduism; (ii) Golden Age of the Guptas.

Frame 2

Main tenets of Hinduism are: (i) Belief in an Omnipotent God. (ii) This belief does not debar them from worshipping several gods signifying the different forms of the same divine, (iii) Worship of several gods gave birth to numerous religious sects of which two are more important having their respective God as Head.

Religious Sects	*God Head*
Vaishnavism	Lord Vishnu
Shaivaism	Lord Shiva

(i) What is the belief of Hinduism?

(ii) Name two important religious sects in Hinduism.

(iii) Name the God Heads of these sects.

NOTES

Answers

(i) Belief in an Omnipotent God;

(ii) Vaishnavism and Shaivaism;

(iii) Vishnu and Shiva.

Frame 3

The principal Hindu Scriptures are the Vedas, the Upanishads, the Darshanas, the Gita, the Ramayana and Mahabharata. Name any five principal Hindu scriptures.

Answers

(i) The Vedas;

(ii) The Upanishads;

(iii) The Darshans;

(iv) The Gita;

(v) The Ramayana.

Frame 4

The Hindus believe in salvation or 'moksha' as the supreme objective of one's life. This objective can be realised by exercising full control over one's own senses. There are believed to be three courses to achieve salvation—the 'Karma Marga', or the way of good deeds; the 'Gyana Marga' or the way of true knowledge and 'Bhakti Marga' or the way of Divine devotion.

(i) What is the objective of a man's life in Hinduism?

(ii) How many courses have been prescribed in Hinduism for salvation?

(iii) What is the meaning of the word 'Karma Marga'?

(iv) What is the other word used for salvation?

Answers

(i) Salvation;

(ii) Way of good deeds;

(iii) Three;

(iv) Moksha.

FRAME 5.

The soul is immortal. It is involved in an unending cycle of births and deaths and rebirths and deaths. The Hindus believe in the theory of 'Karma' which means that actions in one's present life bear their fruit in the next life.

(i) Does the soul die?

(ii) Is the soul Immortal?

(iii) Soul is involved in an,.....cycle of.....and

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(iv) Do the Hindus believe in rebirth?

(v) What is the theory of 'Karma'?

Answers

(i) No;

(ii) Yes;

(iii) Unending, births, deaths;

(iv) Yes;

(v) Actions in one's present life bear their fruit in the next life.

5.5 SUMMARY

In this unit, you have learnt that:

- Programmed learning or programmed instruction is one of the important innovations in the teaching-learning process.
- Programmed learning is related with the 'Law of Effect' as explained by Thorndike.
- Robert Mager (1958) gave a new concept known as 'learner-controlled instruction', which is a kind of Socratic dialogue in reverse, in which the learner led the instructor.
- Rothkopf in 1965 suggested a term mathemagenics.
- According to Gulati and Gulati, programmed learning as popularly understood is a method of giving individual instruction in which the student is active and proceeds at his own pace and is provided with immediate knowledge of results.
- In programmed learning, it is said that the most efficient, pleasant and permanent learning takes place when the student proceeds through a course by a large number of small, easy-to-take steps.
- According to Edgar Dale, 'Teaching is a broad, vague, ill-defined term and instruction is a purposeful, orderly, controlled sequencing of experience to reach a specified goal. Programmed instruction is a sub-head under instruction and represents a more rigorous attempt to develop a mastery, over specified goals to secure insured learning.
- Programmed instruction is a part and not the whole of educational technology. It is a strategy of teaching and learning and self-instructional texts or audio-tutors.
- Programmed instruction is a process of constructing sequences of instructional material in a way that the rate and depth of learning are maximised, understanding is fostered and the motivar tion of the student is enhanced.
- Technology or automation is the only solution to the challenge posed by 'knowledge explosion' and 'population explosion'.
- Programmed instruction can enable the learner to catch up the loss of absence from school.

Check Your Progress

12. What are the stages of programming?
13. What are the skills required at the planning stage?

NOTES

- Programmed learning is considered to be a more efficient method of teaching-learning.
- Programmed materials have been severely criticised as a threat to replacing the teacher. It is also argued that there is too much emphasis in learning facts and very little emphasis on the mastery of principles and concepts.
- Programme learning cannot replace the teacher. Any innovation in the school programmes and practices must remain in the hands of the teachers.
- Technique involved in programmed instruction can be used in teaching different subjects.
- As a result of experimental studies and research, following types of programmed instruction have emerged:
- Linear or Extrinsic Programming.
- Branching or Intrinsic Programming.
- Mathetics Programming.
- Rules System of Programming.
- Computer Assisted Instruction.
- Learner Controlled Instruction.
- B.F. Skinner is the originator of linear programming. It is also called a single track programme.
- In a linear programme, learner's responses are controlled externally by the programmer sitting at a distant place.
- The use of linear programmer is limited to some subjects and topics.
- Branching or intrinsic programming was developed by Norman A. Crowder (1954).
- Branching programme contains multiple choice of items where the learner selects response whereas in linear programmes or Skinnerian style the response are constructed rather than selected.
- Branching programme is helpful in the development of the power of discrimination of the learner.
- Backward branching is based on the principle of'repeating the missed frames.
- In the forward branching, whether the learner makes a wrong choice or correct choice, he will always be going to new pages, thus physically progressing from page to page.
- A linear teaching machine cannot easily be adapted to take branching sequence. This type of machine is made cheat-proof by its technical construction.
- The word 'mathetics' is derived from the Greek work 'mathein' which means to learn.
- In a chain there is a fixed sequence of responses to be . emitted, e.g., steps in division, order of words in a sentence, opening or closing a bottle or tying or untying a shoe lace. Frames that follow indicate the chaining process.

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- Product lifecycle management (PLM) is the procedure of regulating the lifecycle of a product from its conception, through design and manufacture, to service and disposal.
- The development of a programme is a very challenging, highly dynamic and time-consuming exercise. The programmer must have a scientific temper to study all aspects of behaviour, its various forms and levels.
- The programme is meant for the learners. Therefore, a programmer should be fully aware of the characteristics of the learners.
- The programmer should state clearly the type and extent of the behavioural changes to be expected from the learners after going through the programme developed by him.
- The contents should be organised logically as well as psychologically and an ideal balance struck.
- Evaluation enables the programmer to judge the success or the failure of the programme. It is done on internal as well as external criteria.

5.6 KEY TERMS

- **Chain:** In a chain there is a fixed sequence of responses to be emitted, e.g., steps in division, order of words in a sentence, opening or closing a bottle or tying or untying a shoe lace.
- **Self-instructional text:** Reading matters with elaborate instructions for learners.
- **Linear programming:** Learning programmed placed in a linear and systematic manner.
- **Branching programme:** Branching or intrinsic programme is one which adopts to the needs of the learners without the medium of any extrinsic device such as a computer. It is not controlled extrinsically by the programmer.

5.7 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Programmed learning or instruction is a carefully specified, systematically planned, empirically established, skilfully arranged and effectively controlled self-instructional technique for providing individualized instruction or learning experiences to the learner.
2. Mathemagenic behaviour is characterised by activities such as (i) transformation of a nominal stimulus into a effective stimulus (which is to take place within the organism); (ii) some form of elaboration (which, for instance, may take the form of echoic responses); (iii) process exemplified by problem solving and inductive reasoning. These activities must take place before any learning begins.
3. The essential elements of programmed instructions according to Wilbur L. Schramm are (a) an ordered sequence of stimulus items, (b) to each of which a student responds in some specific way, (c) his responses being reinforced by immediate knowledge of results, (d) so that he moves by small steps, (e) therefore, making few errors and practicing mostly correct responses, (f) from what he knows by a process of successively closer approximation, toward what he is supposed to learn from the programme.
4. Software approach refers to application of teaching-learning principles to the deliberate and direct shaping of behaviour.
5. The principles of programmed learning are (i) principle of small steps (ii) principle of activity responding (iii) principle of reinforcement (iv) principle of self-pacing (v) principle of student-evaluation or student testing.
6. The role of the teacher in the changed context of programmed learning may be stated as under:
   - As an adviser in helping students in the selection of programme learning material.
   - As a discussion leader for focussing the attention of the learners on important points.
   - As a guide to clarify doubts and elaborate on various points asked by the learner.
   - As an evaluator of the learning outcomes.
   - As a consultant to the various agencies engaged in production of programmed material.
7. The other name of linear programming is called extrinsic programming.
8. Branching or intrinsic programming was developed by Norman A. Crowder (1954) an American technician.
9. Backward branching is based on the principle of repeating the missed frames.
10. According to Gilbert, 'Mathetics is the systematic application of reinforcement theory to the analysis and construction of complex behaviour repertories usually known as subject-matter mastery, knowledge and skills. Mathetics, if applied diligently, produces materials that exceed the efficiency of lessons produced by any known method.'
11. The areas best suited for mathetics are (i) behaviour requiring chain (ii) skills and complex behaviour repertoirs (iii) behaviour which shows dependence of one on the other.
12. Important stages in programming. These are as given below:
    (i) Preparation
    (ii) Constructing or writing the plan
    (iii) Try-out and revision
    (iv) Evaluation
13. The skills needed at the planning stage are:
    (a) Skill in writing behavioural objectives
    (b) Skill in defining entry behaviour
    (c) Skill in content analysis
    (d) Skill in preparing a criterion test

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5.8 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the characteristics of programmed learning?
2. What are the merits and limitations of programmed learning?
3. What are the advantages of branching programming?
4. How can linear and branching programming be used jointly? Give your view.
5. Given an example of mathetics programme.
6. Briefly state PLM.

Long-Answer Questions

1. What is programmed learning? Explain its concepts.
2. Discuss the principles of programmed learning.
3. Can programmed learning replace a teacher? Give your views.
4. Explain linear programming.
5. Discuss the concept of branching programme.
6. Discuss mathetics as a programmed instruction in education.

5.9 FURTHER READING

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UNIT 6 CLASSIFICATION OF EDUCATIONAL TECHNOLOGY EQUIPMENT

Structure

6.0 Introduction
6.1 Unit Objectives
6.2 Edgar Dale's Cone of Experience
6.3 Mass and Multi-Media Approach
- 6.3.1 Audio-Visual Aids
- 6.3.2 Blackboard
- 6.3.3 Charts
- 6.3.4 Epidiascope
- 6.3.5 Film Strip
- 6.3.6 Map Study
- 6.3.7 Microfilm
- 6.3.8 Projector
- 6.3.9 Reprographic Equipment
- 6.3.10 Three Dimensional Aids
- 6.3.11 Radio's School Broadcast Programmes
- 6.3.12 Educational Television (ETV) or Instructional Television (ITV)

6.4 Summary
6.5 Key Terms
6.6 Answers to 'Check Your Progress'
6.7 Questions and Exercises
6.8 Further Reading

6.0 INTRODUCTION

Educational technologies are not distinct technologies but intricate combinations of hardware and software. These technologies may make use of some combination of audio channels, computer code, data, graphics, video, or text. Technology applications are generally recognized in terms of their most noticeable hardware feature (e.g., a VCR or a computer). However, from the perspective of education, the kind of learning imparted is more significant than the equipment delivering it.

In this unit, you will learn about the multi-media approach and the classification of educational technology equipment.

6.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Explain Edgar Dale's cone of experience
- Describe the use of audio-visual aids
- List the uses of blackboard

- State the types of charts
- Recognize the use of epidiascope, film strip, graphs and magic lantern
- Identify the various aspects of maps
- Interpret three dimensional aids
- List the merits and demerits of radio school broadcasting programmes
- Discuss educational television

6.2 EDGAR DALE'S CONE OF EXPERIENCE

In 1946, Edger Dale developed the theory that a student is able to remember more information when they perform any task as opposed to what they hear, read or observe. His research led to the development of the 'cone of experience'. The Cone is a visual device that classifies systems of varied instructional design and learning processes.

The organizing principle of the Cone was a progression from most concrete experiences (at the bottom of the cone) to most abstract (at the top). The original labels for Dale's ten categories are: direct, purposeful experiences; contrived experiences; dramatic participation; demonstrations; field trips; exhibits; motion pictures; radio – recordings – still pictures; visual symbols; and verbal symbols. Today, learning by doing is known as experiential learning or action learning.

We have tried to explain Dale's Cone of Experience through a diagram below (Figure 6.1), though with slight modification. In the original Cone; the percentages given relate to how much people remember and is a recent modification. One should remember that Dale's intension was not to depict a value judgment of experiences; in other words, his argument was not that more concrete experiences were better than more abstract ones. Dale believed that any and all of the approaches could and should be used, depending on the needs of the learner.

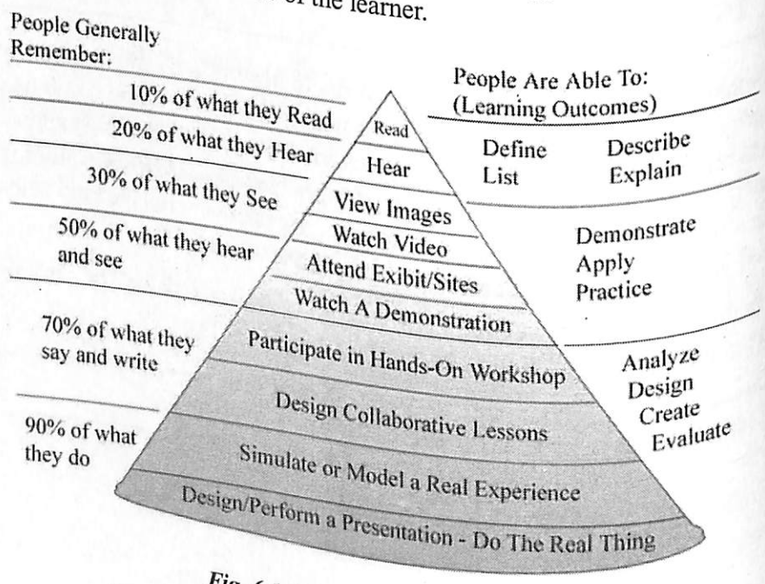


***Fig. 6.1** Dale's Cone of Experience*

Interpreting the cone

The figure above shows the performance ability of students at different level of the Cone, relative to the type of activity they are doing (such as reading, hearing and viewing images). The numerical figures on the left side of the image, what people will generally remember, indicate that practical, hands-on experience in a real-life context will allow students to remember best what they do. This, however, does not mean reading and listening are not valuable learning experiences. Experiencing, while doing a task, helps a learner retain maximum information. This is in part because those experiences near the bottom of the Cone, closer to and including real-world experiences, make use of more of our senses; it is believed that the more senses that are used, the greater our ability to learn from and remember an event or experience.

At the pinnacle of the 'Cone', the direct, purposeful experiences are represented. At the pinnacle of the 'Cone', the verbal symbols are represented.

The experiences included in the cone are as indicated below:

1. ***Direct, purposeful experience:*** The experiences gained through the senses are direct and purposeful. It has been amply observed, 'An ounce of experience is better than a tonne of theory, simply because it is only as an experience that any theory has vital and verifiable significance.' This, direct experience is gained through the aids mentioned at the base of the cone.
2. ***Contrived experience:*** When the real thing cannot be perceived directly, its simplification becomes necessary. Contrived experience is like a working model which is an editing of reality and differs from the original either in size or in complexity. The real object may be too small or too big, may be confused or concealed. In such a situation, imitation is preferred for better and easier understanding.
3. ***Dramatic participation:*** In dramatics, certain real events are presented through the play, the pageant (kind of community drama, usually based on local history), pantomine (actors do not speak, make movements), tablean (pictureline scene in which the characteristics stand still, silently) and the puppets.

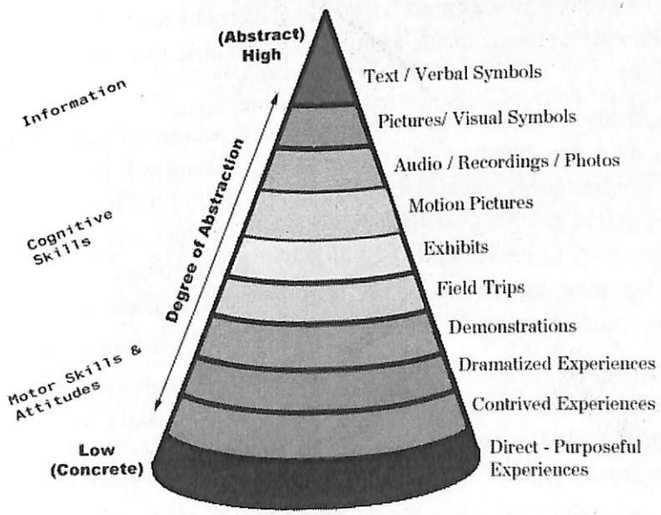


***Figure 6.2** Degree of Abstraction*

Using Dale's cone to enhance second language (SL) learning

While using the Cone theory, it should not be interpreted as indicating that tasks such as reading, listening and viewing experiences should not be put in practice. All of these are important parts of learning a second language and all have a place in the B-SLIM (Success-Guided Language Instructional Model). What should be taken from reviewing Dale's Cone of Experience is that experiences at all levels described should be used in the second language classroom. Just as Gardner describes the multiple intelligences and appealing to them all, Dale's Cone emphasizes learning experiences that appeal to the different senses and the different ways in which we learn. The real-world experiences at the bottom of the Cone relate directly to the 'proving it' stage; it is at this stage of the model that students are encouraged to use what they have learned in new, real-life contexts.

6.3 MASS AND MULTI-MEDIA APPROACH

Among the most significant forces for change in recent years is the technological sophistication we now possess, for this sophistication not only affects our lives in profound ways but also seems to hold a tantalizing promise for increasing our efficiency in education (Kinder, 1973). The last 80 years have seen the development of steam-driven, high-speed rotary presses, advanced optics, films, wire and tape sound recordings, simple and complex duplicating and copy machines, radio, television, computers, and communication lasers.

This technological escalation has bestowed upon education proliferation of equipment and materials which can assist in the reorganization and redefinition of educational experiences. In the past, most teaching depended almost entirely on verbal communication between teacher and student, or written communication to the student from printed materials. Although, these communication channels continue to play important roles in the learning process, today's students are learning facts, skills and attitudes from pictures, television, recorded words, programmed lessons, and other media. Once technology enters the school building, dramatic renovations usually begin. With the technological magic touch, a simple school-house turns into a systematized learning centre.

Today, many countries around the world use some form of technological media in education. In a few countries, the use is fairly widespread. Most technological devices and programmes, however, are structured around the needs of the teacher and are employed as teaching aids in the classroom. In other words, most educators are using technology to answer the question: how can technology help the teacher? In a few areas, however, focus is on the needs of the student. There, educators ask the question: how can technology help the learner?

In the instances, where the student is the centre of attention, technology is the catalyst for educational change. Its absence would make a significant difference to the educational process, because technology is an integral part of a well-thoughtout system, not merely a teacher's aid.

'Audio-Visual Aids', 'Educational Communication Technology', 'Audio-Visual Media', 'Learning Resources' and 'Instructional or Educational Media'. All these terms mean the same thing. Earlier the term used was audio-visual aids in education. With the advancement in the means of communication and that of technology, educators coined new terms. More specifically media refers to films, filmstrips, recordings, etc. The use of newer terms Educational Technology or Instructional Technology is primarily due to the dynamic expansion of programmed learning, computer assisted instruction and educational TV. This revolution in the field of audio-visual education is the outcome of the development in electronics, notably those involving the radio, tape recorder and computer.

The replacement of the older and perhaps more familiar term 'audio-visual material' in education by the new term educational technology or instructional technology is primarily due to the dynamic use and expansion of TV and other existing new developments in the field of audio-visual education that promise much more for the future.

Locatis and Atkinson (1984) define media as the means (usually audio-visual or electronic) for transmitting or delivering messages. Media includes such things as prints, graphics, photography, audio-communication, television, simulating games and computer.

Schramm, Wilber (1973) in his book *Big Media—Little Media, Aid Studies in Educational Technology,* categories computer, VCR, TV as 'big media' and 'radio, filmstrips, graphic, audio cassettes and various visuals as 'little media'.

6.3.1 Audio-Visual Aids

Dutch humanist, theologian and writer Desiderious Erasmus (1466-1536) discouraged memorization as a technique of learning and advocated that children should learn through the aid of pictures or other visuals. John Amos Comenius (1592-1670) prepared a book known as *Orbis Sensulium Pictus,* (The world of Sense Objects) which contained about 150 pictures on aspects of everyday life. The book is considered to be the first illustrated textbook for childhood education. This book gained wide publicity and was used in childhood education centres all over the world. Jean Jacus Rousseau (1712-1778) and other educators stressed the need of pictures and other play materials. Rousseau condemned the use of words by teachers and he stressed 'things'. He pleaded that the teaching process must be directed to the learner's natural curiosity. Pestalozzi (1756-1827) put Rousseau's theory into action in his 'object method'. He based instruction on sense perception. The term 'visual education' was used as early as 1926 by Nelson I. Greene.

Eric Ashby (1967) identified four revolutions in education: education from home to school, written word as tool of education, invention of printing and use of books and lastly the fourth revolution in the use of electronic media i.e., radio, television, tape recorder and computer in education.

Definition of audio-visual aids

Some of the definitions of audio-visual aids are:

Burton: Audio-visual aids are those sensory objects or images which initiate or stimulate and reinforce learning.

Carter V. Good: Audio-visual aids are those aids which help in completing the triangular process of learning i.e., motivation, classification and stimulation.

Check Your Progress

1. What do you understand by experiential learning or action learning?
2. Name the ten categories as mentioned in Dale's 'cone of experience'?

Edgar Dale: Audio-visual are those devices which facilitate the communication of ideas between persons and groups in various teaching and training situations. These are also termed as multi-sensory materials.

Good's Dictionary of Education: Audio-visual aids are anything by means of which learning process may be encouraged or carried on through the sense of hearing or sense of sight.

Kinder, S. James: Audio-visual aids are the devices which can be used to make the learning experience more concrete, more realistic and more dynamic.

Mckown and Roberts: Audio-visual aids are supplementary devices by which the teacher, through the utilization of more than one sensory channels is able to clarify, establish and correlate concepts, interpretations and appreciations.

Psychology of using teaching aids/audio-visual aids

In addition to reading, vicarious experience can be gained from still pictures, films, filmstrips, resource persons, simulations, mock-ups, television and the like. The more concrete and realistic the vicarious experience, the more nearly it approaches the learning effectiveness of the first level. Of course, unless the learner realizes that he is dealing with a substitute, his learning may not be comparable to that of real- life learning.

Interest in the role of the senses in learning was already there in educational circles when instructional media began their ascendancy. It has long been recognized that the various senses condition the reception of messages in the communication act. Research done by Cobun (1968) indicated that:

I per cent of what is learned is from the sense of *taste.*

1.5 per cent of what is learned is from the sense of *touch.*

3.5 per cent of what is learned is from the sense of *smell.*

11 per cent of what is learned is from the sense of *hearing.*

83 per cent of what is learned is from the sense of *sight.*

Retention of what is learned is likewise related to th sense experience.

Observation and research by Cobun tended to show the holding time as nearly constant as possible, that people generally remember: 10 per cent of what they *read,* 20 per cent of what they *hear*, 30 per cent of what they *see*, 50 per cent of what they *hear and see,* 70 per cent of what they *say*, 90 per cent of what they *say* as they do a thing.

Meaning, significance and advantages of audio-visual aids

Audio-visual aids or devices or technological media or learning devices are additional devices that help the teacher to clarify, establish, co-relate and co-ordinate accurate concepts, interpretations and appreciations and enable him to make learning more concrete, effective, interesting, inspirational, meaningful and vivid. They help in completing the triangular process of learning viz., motivation, clarification and stimulation. The aim of teaching with technological media is 'clearing the channel between the learner and the things that are worth learning'. The basic assumption underlying audio-visual aids is that learning—clear understanding—stems from the sense

experience. The teacher must 'show' as well as 'tell'. Audio-visual aids provide significant gains in informational learning, retention and recall, thinking and reasoning, activity, interest, imagination, better assimilation and personal growth and develop-ment. The aids are the stimuli for learning 'why', 'how.', 'when' and 'where'. The 'hard to understand principles' are usually made clear by the intelligent use of skilfully designed instructional aids.

According to Gandhi, 'True education of the intellect can only come through a proper exercise and training of bodily organs— hands, feet, eyes, ears and nose.'

Commenting on the use of audio-visual aids, the Kothari Commission 1964-66 observed that it should indeed bring about an 'educational revolution' in the country. It further stated that the supply of teaching aids to every school was essential for the improvement of the quality of teaching.

The National Policy on Education, 1986, and as modified in 1992 has laid a great stress on the use of teaching aids, especially improvised aids, to make teaching-learning more effective and realistic.

In the words of Edgar Dale, 'Since audio-visual materials supply concrete basis for conceptual thinking, they give rise to meaningful concepts enriched by meaningful association, hence they offer the best antidote for the disease of verbalism.'

Some of the important values of the proper use of audio-visual aids are given below:

1. ***Best motivators:*** They are the best motivators. The students work with more interest and zeal. They are more attentive.
2. ***Antidote to the disease of verbal instruction:*** They help to reduce verbalism. They help in giving clear concepts and thus help to bring accuracy in learning.

   As observed by Raymond Wyman (1957), 'We (teacher) tell students, and we provide them with written material most of the time. Words are wonderful. They are easily produced, reproduced, stored and transported. However, the overuse or excessive use of words can result in serious problem, chiefly, the problem of verbalism (using or adopting words or phrases without considering what they mean) and forgetting.'
3. ***Clear images:*** Clear images are formed when we see, hear, touch, taste and smell as our experiences are direct, concrete and more or less permanent. Learning through the senses becomes the most natural and consequently the easiest.
4. ***Vicarious experience:*** It is beyond doubt that the first-hand experience is the best type of educative experience. But it is neither practicable nor desirable to provide such experience to pupils.

   Substituted experiences may be provided under such conditions. There are many inaccessible objects and phenomena. For example, it is not possible for the pupils living in India to see the eskimos. Similarly, it is not possible for an average man to climb the Mount Everest. There are innumerable such things to which it is not possible to have direct access. So, in all such cases, these aids help us.
5. ***Variety:*** Mere 'chalk and talk' do not help. Audio-visual aids give variety and provide different tools in the hands of the teacher.

6. ***Freedom:*** When audio-visual aids are employed, there is great scope for children to move about, talk, laugh and comment upon. In such an atmosphere the students work because they want to work and not because the teacher wants them to work.
7. ***Opportunities to handle and manipulate:*** Many visual aids offer opportunities to students to handle and manipulate things.
8. ***Retentivity:*** Audio-visual aids contribute to increased retentivity as they stimulate response of the whole organism to the situation in which learning takes place.
9. ***Based on maxims of teaching:*** The use of audio-visual aids enables the teacher to follow the maxims of teaching like 'concrete to abstract', 'known to unknown' and 'learning by doing'.
10. ***Helpful in attracting attention:*** Attention is the true factor in any process of teaching and learning. Audio- visual aids help the teacher in providing proper environment for capturing as well as sustaining the attention and interest of the students in the classroom work.
11. ***Helpful in fixing new learning:*** What is gained in terms of learning, needs to be made definite up in the minds of students. Audio-visual aids help in achieving this objective by providing several activities, experiences and stimuli to the learners.
12. ***Saving of energy and time:*** A good deal of energy and time both of the teachers and students can be saved on account of the use of audio-visual aids as most of the concepts and phenomena may be easily clarified, understood and assimilated through their use.
13. ***Realism:*** The use of audio-visual aids provides a touch of reality to the learning situation. By watching a film show the life of the people of the Tundra region, students learn it more effectively in about two hours than by spending weeks by reading.
14. ***Vividness:*** Audio-visual aids give vividness to the learning situation. A film on Buddha provides a vivid picture of his life and teachings.
15. ***Meeting individual differences:*** There are wide individual differences among learners. Some are ear-oriented, some can be helped through visual demonstrations, while others learn better by doing. The use of a variety of audio-visual aids helps in meeting the needs of different types of students.
16. ***Encouragement to healthy classroom interaction:*** Audio- visual aids, through their wide variety of stimuli, provision of active participation of the students, and vicarious experiences encourage healthy classroom interaction for the effective realization of teaching-learning objectives.
17. ***Spread of education on a mass scale:*** Audio-visual aids like radio and television help in providing opportunities for education to people living in remote areas. They also help in promoting adult education.
18. ***Promotion of scientific temper:*** In place of listening to facts, students observe demonstrations and phenomena and thus cultivate scientific temper.
19. ***Development of higher faculties:*** Verbalism promotes memorization. Use of audio-visual aids stirs the imagination, thinking process and reasoning power of the students, and calls for creativity, and inventiveness and other higher mental activities on the parts of students and thus helps the development of higher faculties among the students.
20. ***Reinforcement to learners:*** Audio-visual aids prove effective reinforcers by increasing the probability of reoccurrence of the responses associated with them and thus, render valuable help in the teaching-learning process.
21. ***Positive transfer of learning and training:*** Use of audio-visual aids helps in the learning of other concepts, principles and solving the real problems of life by making possible the appropriate positive transfer of learning and training received in the classroom.
22. ***Positive environment for creative discipline:*** A balanced, rational and scientific use of audio-visual aids develops motivation, attracts the attention and interests of the students and provides a variety of creative outlets for the utilization of their tremendous energy and thus keeps them busy in the classroom work. In this way, the overall classroom environment becomes conducive to creative discipline.

Characteristics

1. They should be meaningful and purposeful.
2. They should be accurate in every respect.
3. They should be simple.
4. They should be cheap.
5. As far as possible, they should be improvised.
6. They should be large enough to be properly seen by the students for whom they are meant.
7. They should be up-to-date.
8. They should be easily portable.
9. They should be receptive to the mental level of the students.
10. They should motivate the learners.

Principles

1. ***Principle of selection:*** Teaching aids prove effective only when they suit the teaching objectives and unique characteristics of the special group of learners. Following points may be kept in view in this regard:
   (i) They should suit the age-level, grade-level and other characteristics of the learners.
   (ii) They should have specific educational value besides being interesting and motivating.
   (iii) They should be the true representatives of the real things.
   (iv) They should help in the realization of desired learning objectives.
2. ***Principle of preparation:*** This principle requires that following points should be attended to:
   (a) As far as possible, locally available material should be used in the preparation of an aid.

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(b) The teachers should receive some training in the preparation of aids.
(c) The teachers themselves should prepare some of the aids.
(d) Students may be associated in the preparation of aids.

3. ***Principle of physical control:*** This principle relates to the arrangement of keeping aids safely and also to facilitate their lending to the teachers for use.
4. ***Principle of proper presentation:*** This principle implies the following points:
   (i) Teachers should carefully visualize the use of teaching aids before their actual presentation.
   (ii) They should fully acquaint themselves with the use and manipulation of the aids to be shown in the classroom.
   (iii) Adequate care should be taken to handle an aid in such a way as no damage is done to it.
   (iv) The aid should be displayed properly so that all the students are able to see it, observe it and derive maximum benefit out of it.
   (v) As far as possible, distraction of all kinds should be eliminated so that full attention may be paid to the aid.
5. ***Principle of response:*** This principle demands that the teachers guide the students to respond actively to the audio-visual stimuli so that they derive the maximum benefit in learning.
6. ***Principle of evaluation:*** This principle stipulates that there should be continuous evaluation of both audio-visual material and accompanying techniques in the light of the realization of the desired objectives.

Problems

While all these aids are becoming more popular day-by-day, there are still some problems to be faced and solved. These are:

(i) ***Apathy of the teachers:*** Teachers in general are yet to be convinced that teaching with words alone is very tedious, wasteful and ineffective.
(ii) ***Indifference of students:*** The judicious use of aids arouses interest but when used without a definite purpose they lose their significance and importance.
(iii) ***Ineffectiveness of the aids:*** Due to absence of proper planning and lethargy of the teacher and without proper preparation, correct presentation, appropriate application and discussion and the essential follow-up work, the aids do not prove their full usefulness. A film like a good lesson has various steps—preparation, presentation, application and discussion.
(iv) ***Financial hurdles:*** The central and state governments have set up boards of audio-visual education and have chalked out interesting programmes for the popularization of teaching aids, but lack of finances is not enabling them to do their best.
(v) ***Absence of electricity:*** Most of the projectors, radio and television cannot work without supply of electricity which is still not available in a large number of schools.

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(vi) ***Lack of facilities for training:*** Training colleges or specialized agencies should make special provision to train teachers and workers in the use of these aids.
(vii) ***Co-ordination between centre and states:*** Good film libraries, museums of audio-visual education, fixed and mobile exhibitions and educational 'melas' should be organized both by the centre and the states.
(viii) ***Language difficulty:*** Most educational films are in English. We should have these in Hindi and other Indian languages.
(ix) ***Not catering to local needs:*** Little attention is paid in the production of audio-visual aids to the local sociological, psychological and pedagogical factors.
(x) ***Improper selection of films:*** Films are not selected according to the classroom needs.

Future of teaching aids

Today, the problem is not whether visual aids should have a place in education or not. Their place has been recognized long ago. The problem, now, is that of extending the benefits of these aids to all teachers and children. The future can be bright if there is proper planning on the part of the government and co-ordination between producers, teachers and students. Useful and effective aids can be produced after getting the reaction of the audience and doing research work in the field. A great deal is being done already but a lot more still remains to be done.

Classification

Classification Number 1: Projected and non-projected aids

Projected Aids	*Non-Projected Aids*				
	Graphic Aids	*Display Boards*	*3-Dimensional Aids*	*Audio Aids*	*Activity Aids*
1. Films	1. Cartoons	Black-Board	Diagrams	Radio	1. Computer-Assisted Instruction
2. Filmstrips	2. Charts	Bulletin	Models	Recording	2. Demonstrations
3. Opaque Projector	3 Comics	Flannel Board	Mockups	Television	3. Dramatics
4. Overhead Projector	4. Diagrams	Magnetic Board	Objects		4. Experimention
5. Slides	5. Flash Cards	Peg Board	Puppets		5. Field Trips
	6. Graphs		Specimens		6. Programmed Instruction
	7. Maps				7. Teaching Machines
	8. Photographs				
	9. Pictures				
	10. Posters				

Classification Number 2: Audio materials, visual materials and audio-visual materials

Audio Materials	*Visual Materials*	*Audio-visual Materials*
(1) Language laboratories	(1) Bulletin boards	(1) Demonstrations
(2) Radio	(2) Chalk boards	(2) Films
(3) Sound distribution system sets	(3) Charts	(3) Printed materials with recorded sound
(4) Tape and disco recordings	(4) Drawings etc.	(4) Sound filmstrips
	(5) Exhibits	(5) Study trips
	(6) Filmstrips	(6) Television
	(7) Flash carts	(7) Videotapes
	(8) Flannel boards	
	(9) Flip books	
	(10) Illustrated books	
	(11) Magnetic boards	
	(12) Maps	
	(13) Models	
	(14) Pictures	
	(15) Posters	
	(16) Photographs	
	(17) Self-instructional	
	(18) Silent films	
	(19) Slides	

Classification Number 3: Hardware and software in teaching aids

Educational technology can be classified into two categories, i.e., the hardware approach and software approach.

Hardware approach: It is based on the application of engineering principles for developing electro-mechanical equipments for instructional purposes. This approach is the result of the impact of scientific and technological development during the present century. Hardware approach mechanizes the process of teaching so that teachers would be able to deal with more students with less expenditure in educating them. Hardware devices include the following:

1. Computers
2. Epidiascope
3. Magic lantern
4. Motion pictures
5. Overhead projector
6. Radio
7. Slide and Film projector
8. Tape recorders
9. Teaching machines
10. Television

Software approach: This uses the principles of psychology for building in the learner a complex repository of knowledge modifying his behaviour. It has originated from the pioneering work of Skinner and other behaviourists. The programmes which such a technology produces, are often called 'software'. Software approach is characterized by task analysis, writing precise objectives, selection of appropriate learning strategies, immediate reinforcement of responses and constant evaluation. Newspapers, books, magazines, educational games, flash cards may also form part of software.

Classification Number 4: Big media and little media

Big media includes computer, VCR and TV. Little media includes radio, films strips, graphics, audio cassettes and various visuals.

Classification Number 5: Three Dimensional Aids

(i) Models

(ii) Mock-ups

(iii) Specimens

Three dimensional aids are the replicas or substitutes of real objects.

6.3.2 Blackboard

Blackboard is a unique device which in spite of newer and better devices in vogue is irreplaceable as well as indispensable. It is the oldest and the best friend of a teacher. It is a mirror through which students visualize all about the teacher's mind, his way of explaining, illustrating and teaching as a whole. It is the cheapest and the most valuable teaching device and continues to be the 'sine qua non' of our educational system. It is the most universally used aid. Writing on sand and clay was the ancient form of blackboard writing.

The use of blackboard in class teaching creates an informal atmosphere and motivates learning. Teaching no longer confines to any one instructional device. It is a help to 'planning', to 'crystallizing' main points and to 'summarizing' and 'reviewing' results. Blackboard being a simple means of dealing with the whole class as a unit, is extensively used during the course of a lesson.

Following are the uses of blackboard:

1. The teacher can illustrate his lesson on the blackboard and draw the attention of the class to salient features in the lesson.
2. The lesson can be divided and summarized in the right manner. Abstract statement can be clarified in the expository stage and a summary containing important points can be given in the recapitulatory stage.
3. Questions and problems when planning class work or approaching a new subject can be listed by the teacher on the blackboard.
4. Pupils' interest in class work can be stimulated by blackboard writings and drawings.

5. It can be put to wide and varied uses. A teacher can use it for graphs, maps, graphic statistics, sketches and various types of drawings.
6. It provides a lot of space for decorative and creative work.
7. The teacher can erase writings and drawings and start afresh.
8. It helps the teacher to focus the attention of his students on the lesson.
9. A teacher can review the whole lesson for the benefit of the class with the help of the blackboard.

Types of blackboards

1. ***Fixed blackboard:*** Fixed in the wall facing the class and normally made of wood or concrete cement.
2. ***Blackboard on easel:*** A portable and adjustable blackboard put on a wooden easel can be taken out of the classroom while taking classes in the open.
3. ***Roller blackboard:*** Made of thick canvas wrapped on a roller mostly used for teaching higher classes.
4. ***Graphic board:*** It has graphic lines and is used for teaching mathematics, science and statistics.
5. ***Magna board:*** A board which enables teachers to make three-dimensional demonstrations with objects on a vertical surface. Small magnets are used to hold suitable objects fixed wherever they are put on this vertical surface.

Following points may be kept in view while using the blackboard:

1. Blackboard should be kept clean so that writing on it could be easily read by the students from all parts of the room.
2. Writing on the blackboard should be legible.
3. Letters and drawings should be large enough to be seen from all parts of the room.
4. Begin writing from the top left corner.
5. Writing should be in straight rows.
6. Extreme lower corner of the blackboard should not be made use of as writing on it cannot be seen easily.
7. Material on the blackboard should not be covered by standing in front of it.
8. Only salient points of the subject-matter should be written on the blackboard.
9. Diagrammatic visual presentation involving many processes should be prepared before the beginning of the lesson.
10. It should be ensured that blackboard is well-lit by natural or artificial means.
11. Everything needed for the blackboard should be made available before the class begins i.e., collection of chalk, rulers, compass, and projector.
12. While writing on the blackboard, the teacher should ensure that the class is attentive.
13. Duster and not hand or handkerchief should be used in cleaning the blackboard.

14. Occasionally students may be asked to write or draw a diagram on the blackboard.
15. Teachers should develop the ability to draw freely on the blackboard. The map or chart or diagram that grows before the very eyes of the students is much more useful and valuable than a well finished map, chart or diagram.
16. It should be ensured that the blackboard is periodically serviced.

6.3.3 Charts

A chart is a combination of pictorial, graphic, numerical or vertical material which presents a clear visual summary. The most commonly used charts include outline charts, tabular charts, flow charts and organization charts. Other types of charts are technical diagrams and process diagrams. Flip charts and flow charts are also being used. Readymade charts are available for use in teaching in almost all subjects. But charts prepared by a teacher himself incorporating his own ideas and lines of approach of the specific topic are more useful.

Charts serve the following purposes:

1. For showing relationship by means of facts, figures and statistics
2. For presenting material symbolically
3. For summarizing information
4. For showing continuity in process
5. For presenting abstract ideas in visual form
6. For showing development of structure
7. For creating problems and stimulating the thinking process
8. For encouraging utilization of other media of communication
9. For motivating the students

How to use charts effectively

1. Teacher-made charts should be preferred.
2. Students should be involved in the preparation of charts.
3. Charts should be so large that every detail depicted should be visible to every pupil in the class wherever he is sitting.
4. Charts should display information only about one specific area in a subject.
5. A chart should not contain too much written material.
6. A chart should not contain too many details.
7. A chart should give a neat appearance.
8. When a chart is to be used in the classroom, the teacher should make sure that there is provision for hanging the chart at a vantage point.
9. The teacher should have a pointer to point out specific facts in the chart.
10. Straight pins, staples, pegboard clips, gummed hangers, paper-clips, folded making tapes may all be used for fastening charts without damaging them.
11. Charts should be carefully stored and preserved for use in future.

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Types of charts

The following is a list of basic types of charts in terms of arrangements and the kinds of ideas which they may express:

1. The narrative chart, an extended left-to-right arrangement of facts and ideas for expressing: (a) the events in a process such as shoe making, oil cracking, or the like, (b) the events in the development of a significant issue to its point of resolution or to the present status (sometimes a time limit). For example, the events leading to the separation of the Bangladesh from Pakistan, the events leading to the establishment of the idea that an individual should be free and that he should have a voice in his own government and the events leading to increased regulation of business by government (c) technological improvement over a period of years such as improvement in transportation, communication, manufacturing etc.
2. The tabulation chart, a left-to-right, top-to-bottom arrangement of facts and ideas for expression: (a) numerical data for making comparisons, (b) lists of products, mountains, rivers, or the like in selected areas.
3. The cause and effect chart, usually a limited left-to-right arrangement of facts and ideas for expressing: (a) Relationship between standard of living and such factors as economic system, availability of natural resources, level of technological advancement, (b) relationship between a culture and neighbouring cultures, (c) relationship between rights and responsibilities, (d) relationship between a complex of conditions and change or conflict, (e) relationship between the elected and the electors, (f) relationship between community workers and the community which supports them.
4. The chain chart, a circular or semi-circular arrangement of facts and ideas for expressing: (a) Transitions, such as the transition from raw materials to useful products, (b) cycles, such as the water cycle.
5. The evolution chart, a left-to-right arrangement of facts and ideas for expressing: (a) changes in specific items from beginning to date, perhaps with projections into the future. For examples, automobile and its subsequent development, early basic homes and changes in basic homes to date, (b) change in the standard of food consumption, length of work, weak purchasing power of a rupee, or the like.

6.3.4 Epidiascope

The epidiascope is an instrument which can project images or printed matter or small opaque objects on a screen, or it can project images of a 4′ × 4′ slide. With the help of an epidiascope, any chart, diagram, map, photograph and picture can be projected on the screen without tearing it off from the book. No slide is needed for this purpose. An epidiascope serves two purposes. It works as epidiascope when it is used to project an opaque object. It works as diascope when it is used to project slides (by operating a lever). It works on the principle of horizontal straight line projection with a lamp, plane mirror and projection lens. A strong light from the lamp falls on the opaque object. A plane mirror placed at an angle of 45° over the project, reflects the light so that it passes through the projection lens forming a magnified image on the screen. (Figure 6.2)

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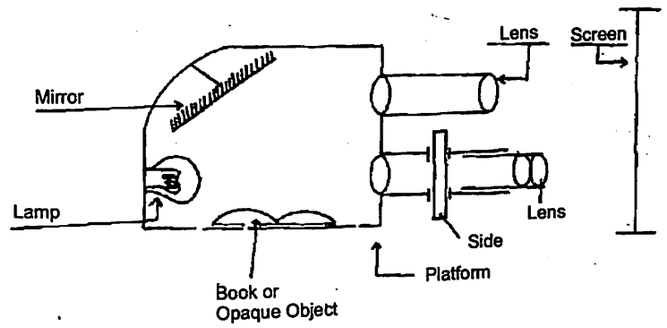


Fig. 6.2 Epidiascope

6.3.5 Film Strip

A film strip is 35 mm wide and has a series of 12 to 48 picture frames arranged in a sequence so that they develop a theme. A film strip can be prepared by taking a series of photographs using a 35 mm camera and then by taking a positive print of the negative film on another 35 mm film.

Globe

Knowledge of map is unreal without the knowledge of globe—the true map. It is the true representative of earth's physical personality.

A globe gives a true idea of the total environment at a glance in a classropm situation. It'is through globe that a child can under-stand the concepts of time, and space. Hence, every school shall have globes. Four types of globes may be kept in every school. (1) political globes, (2) physical globes and (3) washable projection globes, (4) celestial globes.

Graphs

Graphs are flat pictures which employ dots, lines or pictures to visualize numerical and statistical data to show relationships or statistics.

Graphs are of several types:

- ***Line graph:*** In a line graph, data is represented with the help of simple lines horizontally or vertically drawn. For increasing the interest and readability of concepts, pictorial illustrations and cartoons are occasionally used on the line graph.
- ***Bar graph:*** A bar graph consists of bars arranged, horizontally or vertically from a 'zero' base. The colour, length and size of the bars represent different values. (Fig. 6.3)
- ***Circle graph:*** Data may be presented in a circle graph. (Fig. 6.4)

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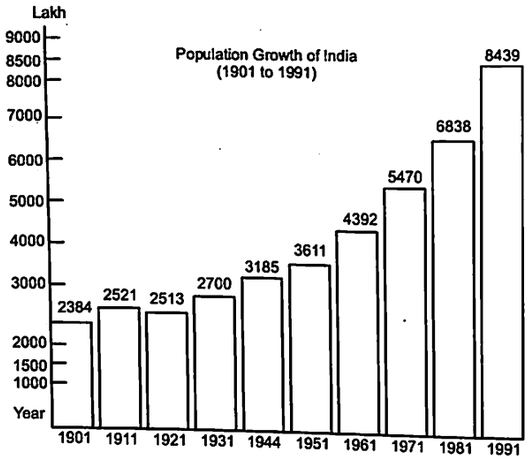


Fig. 6.3 Illustration of a Bar Graph

Literacy in India (1991)

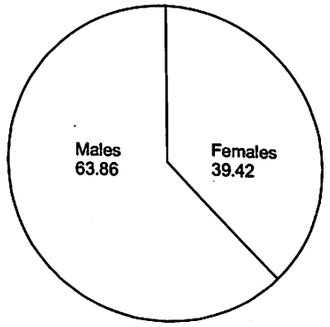


Fig. 6.4 Illustration of a Circle Graph

Magic lantern

Magic lantern is the earliest invention in the history of audio-visual aids used for projecting pictures from a transparency (slide) on a wall or screen. When the figure or illustration is very small and it is required to be shown to the entire class, a transparent slide of the small figure is prepared. Then, this slide is placed into the slide carrier part of the magic lantern. This magic lantern device projects it on the screen by enlarging its dimension and making the vision more clear and sharp.

6.3.6 Map Study

In several subjects, especially social studies, learning of many geographical, historical and economic concepts remains unreal, inadequate and incomplete without a map. A resourceful teacher by motivating the pupils will turn the fear of map into a genuine love for them. This, however, pre-supposes the invariable use of maps at every possible opportunity by the teacher in the classroom, and the possession of individual atlases by the pupils. Every student should also know certain elementary aspects of map preparation such as copying, enlarging and reducing, symbolizing, colouring, and preparation of key components. Most of the students develop an aversion to maps because they are not aware of the skills required for map preparation.

A map is an accurate representation plain surface in the form of a diagram drawn to scale, giving the details of boundaries of continents and countries.

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Geographical details like location of mountains, rivers, altitude of a place, contours of the earth surface and important locations can also be represented accurately with reference to a convenient scale with suitable colour scheme.

Identification of various aspects of maps

1. Understanding and interpreting the key of index
2. Understanding the lines—boundary lines, lines of communication, lines indicating the rivers, contours, meridians and parallels
3. Understanding the colours, tints, shadows, symbols on a map or globe
4. The top of every map is not north, but the direction of north pole is north
5. Distinction between the various types of maps such as relief, political, and distribution maps
6. Understanding of the position of earth in the universe. Many students suffer from a notion that the earth leans in June towards the sun northwards and in December southwards and thus, seasons are formed. Earth never tills that way. The student shall understand that the inclination of earth is constant and the leaning effect changes due to its rotation around the sun.

Types of maps

1. ***Relief maps*** (regional and the world): This requires knowledge of colours, contours, symbols and other concepts related to making maps.
2. ***Historical maps:*** Maps in history reveal the changing times and the growth and decline of various kingdoms. Knowledge of lines of boundaries and other symbols is necessary.
3. ***Distribution maps:*** Generally, the student shall associate with the following types of distribution maps:
   (1) Vegetation maps
   (2) Population maps
   (3) Economic maps
   (4) Statistical maps
   (5) Dot maps
   (6) Pictorial maps
   (7) Language, race and other human division maps, etc.
4. ***Geographical maps:*** Contour maps, weather maps, seismological maps, archaeological maps, rainfall maps, geological maps, etc.

6.3.7 Microfilm

The microfilm and microfiche are used widely for storage and retrieval of information. Microfilms contain photographed reading material on a 35 mm film, each frame being the reduced photograph of a printed page. Thus, printed matter of a book can be stored in a small loop of 35 mm film. When the microfilm is passed through a microfilm reader, an enlarged image approximately of the size of the printed page is formed on a ground glass (rear-view) screen and the observer can read the matter. By moving the film through the microfilm reader, images of different pages can be obtained and read.

Models

Models are substitutes for real things. A model is a three-dimensional representation of a real thing. Models are concrete objects to explain clearly the structure or functions of real things. A model is a replica of the original. Models enable students to have a correct concept of the object.

Being three dimensional, models evoke great interest and simplify matter. Models enable us to reduce or enlarge objects to an observable size. It may not be possible or even practicable to make students see the whole of a large industrial unit or even a large machine unit, but a model will give the correct perspective. Prepa-ration of models could form a topic for project work. It is essential to create interest in creative activity in students.

Models are working as well as static. A working model will secure immediate attention and serve as motivation to learn.

A model can be prepared with several kinds of material like cardboard, plastic, plaster of paris, wood, clay, and thermocole.

6.3.8 Projector

These are different kinds of projectors, some of them are:

(a) ***Micro-projector:*** The combination of a microscope and a slide projector is an instrument called micro-projector. The microscope is used to see very minute parts of objects by magnifying the same hundreds of times. The minute part usually of a plant or an animal is put on a glass slide and a magnified image formed by a combination of lenses in a microscope which can be seen by an individual through the naked eye. The micro- projector attachment consists of a projection lens, a plane mirror fixed at 45 degrees to the vertical plane and a vertical ground glass screen. It is very useful in teaching science. (Fig. 6.5)

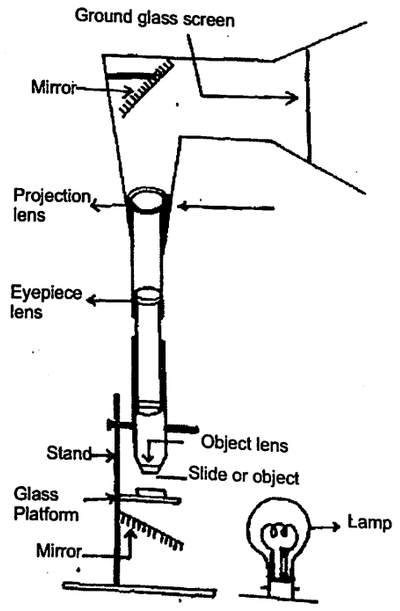


Fig. 6.5 Micro Projector

(b) ***Overhead projector (OHP):*** Overhead projector is a device that can project a chart, diagram, map, table or for that matter, anything written on transparent plates, upon a screen or the white wall before students in a class. This makes teaching illuminative, illustrative and impressive. It also saves a great deal of the teacher's time used in drawing or writing them. These transparencies can also be preserved by the teacher for future display while taking up the same topic. It is very simple to prepare such transparencies. All that a teacher has to do is to draw or write, as the case may be, upon transparent plates with any dark ink with a fibre tipped pen. Any material meant for display before the class while teaching can also be typed on such transparencies using a good carbon paper. In case transparencies are to be washed out for use, washable water colour can also be used for writing on the transparencies. (Fig. 6.6)

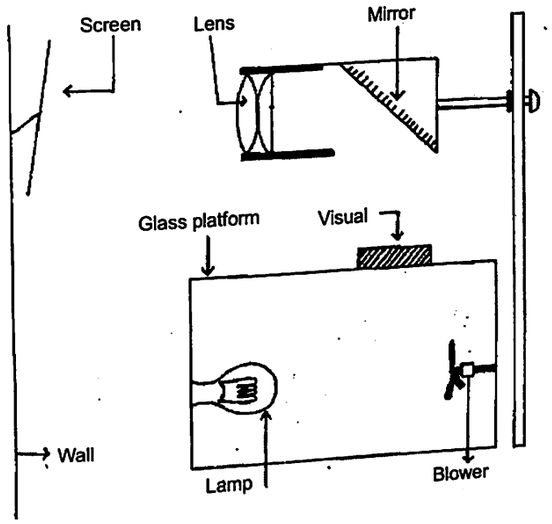


Fig. 6.6 Overhead Projector

Slide projector: With a slide projector, photographic slides can be projected on the screen or the wall before the class. Photographs of relevant matter meant for teaching in the class can be developed on celluloid slides and displayed with the help of such a projector. The teacher's lesson can also be recorded on an audio cassette and played with a tape recorder suitably synchronizing with the slides by manipulating a remote control switch. Such an arrangement is called a tape-slide sequence. In case there are several slides to be shown in quick succession, the tape-slide sequence can bring as interesting an effect on the viewers as do the movie films.

An ordinary slide projector has a frame containing two slits into which slides are put for focusing. They are manually and continuously replaced by other slides one after another.

An improved type of a slide projector consists of a circular disc with more slits where even a hundred or more slides can be inserted in a sequential order which can be projected on the screen with the help of a remote control switch to be suitably manipulated by the teacher as he delivers the lesson. (Fig. 6.7)

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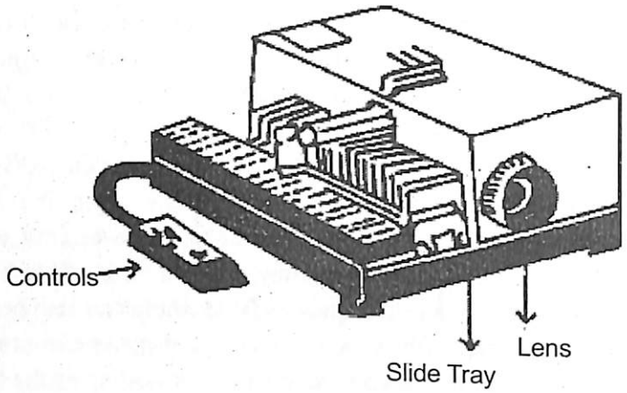


Fig. 6.7 36 mm Automatic Slide Projector (Linear Slide Tray)

6.3.9 Reprographic Equipment

Reprography is a branch of technology dealing with the methods of duplication or reproduction. Duplication involves making a number of identical copies of the original. Reproduction enables preparation of one or more identical copies of the original, same size or of different size in monochrome or colour. Equipment and processes included are duplicators, reflex printing and photography.

Record player

Record players are a means of audio playback. They are older types of hardware using records of discs for the needed playback. Four sizes of records 7″, 10″, 12″ and 16″ are in common use. There are also high speed records played with standard stylus. The record players now in use are equipped with speed changer mecha-nisms permitting the playing of the slower long-playing 45, $33^{1/3}$ and $16^{2/3}$ r.p.m. records played by microgrove stylus. The use of recorded pieces in education has great value in language learning, appreciation of poetry and literature and presentation of brief dramatized episodes from history, from development of musical knowledge and discrimination. Long-playing records with 20 minutes of recorded information per side provide several diverse selections inscribed on each side and are very suitable for classroom instructional purposes. The needed selection for a particular learning situation can be easily identified by the specific microgrove ring it occupies on the record. 'Talking books' for the blind also consist of recordings of essential literature for the visually handicapped. The older, manually wound spring powered gramophone's place now has been taken up by electrically powered multi-speed record players and changers with built-in amplifying unit or linked to separate amplifying units and speakers. Likewise, the older mechanical recording has given place to electrical imprinting involving greater clarity and fidelity.

Tape-recorder: A tape-recorder in its own can be very effective for classroom instruction. Pre-recorded tapes consisting of lessons by eminent teachers on any subject can be played in the class. Such instructions become impressive not only because of the novelty but also because of their being well- thought out and planned.

The tape-recorder has proved to be a boon in teaching foreign languages like English. Pre-recorded tapes on English lessons can be played in the classroom to

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teach not only the contents of the lesson but also proper accent, pronunciation and intonation which an average English teacher very much lacks. (Fig. 6.8)

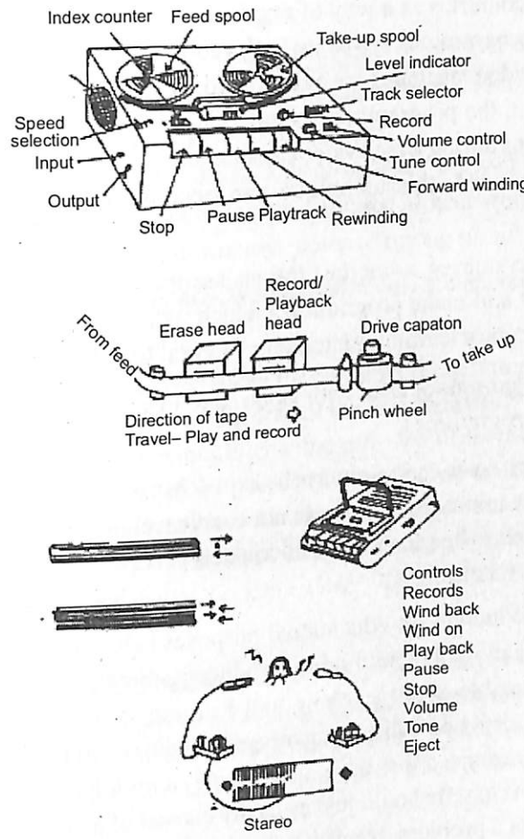


Fig. 6.8 Components of a Tape-records

Video tapes played through TV: Pre-recorded video tapes can be played through TV in the classroom. Video films on educational topics shown through TV in the classroom have a similar effect on students as the ordinary cinematic educational films. Video filmje have the added advantage over ordinary films in that the arrangement is compact and requires little space and time for manipulation. It is the most convenient of all audio-visual teaching-learning material.

Video cassettes

The potential advantage of video cassette lies in the fact that control of the equipment and the learning process is placed in the hands of the learner through control over the mechanics of the machine, i.e. stopping, starting, timing, reviewing and previewing and consequently the capacity to order the sequence of events, controls the rate of learning, and facilitates practice sequences.

The potential exists for providing the basis for learning a wide range of motor, intellectual and cognitive and interpersonal skills, as well as affective aspects. These are important aspects which printed materials cannot deal with adequately.

This facility could be particularly useful where distance education programmes are involved with updating skills and techniques of workers in the field. For example,

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new horticultural techniques can be transmitted to field workers to improve farming techniques.

In some countries as a way of regionalizing a centrally produced programme, video cassette programmes are being built round the study centre concept, a location where several video machines are available to which students bring their study notes. The students run the programmes as individuals. Sometimes study centres provide for group sessions during which video cassettes are played. Unless some supplementary teaching is provided, this technique can become another version of broadcast technology.

In other countries, some institutions assume that students can gain access to such equipment and make programmes which will be used on an individual basis as either supplementary learning material or integral to the teaching programme.

The problems associated with video cassettes are of two kinds: (i) cost; and (ii) production of programmes.

(i) Equipment costs cannot always be kept down by using lower quality equipment. Cheaper equipment formats do not enable technical material such as animal or plant tissue to be represented adequately or tapes to be reproduced in quantity without loss of fidelity.

(ii) Video production for educational purposes calls for new techniques different from the entertainment modes. Producers, directors, scriptwriters need to be knowledgeable about teaching and learning. Many of the old techniques of film and television will no longer be of use. For example, the very basic concept that programmes must have a beginning, a middle, and an end will no longer apply as a cassette could just as easily consist of a series of short video events which sets a problem, teaches a technique, or brings together a range of visual material to make concepts or principles clear.

6.3.10 Three Dimensional Aids

Three dimensional aids serve as good substitutes for the real objects. There is no doubt that an encounter with real objects serves as an unmatchable source of learning. But on account of several reasons it may not be possible to bring the real objects in the classroom. The real objects may be too large to move or store in the classroom. It may be too small to be seen for a group of students. It can be too complicated in real form to be understood. It may be too swift for its operations to be understood. Its movements may be too slow to be studied completely. It can be too expensive to be purchased by an educational institution. Being handicapped in such situations a teacher has to search for some good substitute for the real objects.

Models, diagrams, mock-ups and specimens are the important three dimensional aids.

Models: Models are the replicas or copies of the real objects. Models are usually of three types: solid, cross-sectional and working. Models are concrete objects, some considerably larger than the real object. Sectional models explain clearly the structure or functions of the original. In some cases working models of the original are used where the specific function of the original is duplicated and could be explained easily.

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Following are the important functions of models:

1. Models simplify reality
2. Models concretize abstract concepts
3. Models enable us to reduce or enlarge objects to an observable size
4. A model provides the correct concept of an industrial unit or a bridge or a dam like the Bhakra Dam, etc
5. A working model explains the various processes of objects and machines
6. Preparation of models could form a topic for project work. This in very helpful to create interest in creative activity among pupils

Cardboard, plastic, plaster of paris, wood, thermocole and metal can be used in the preparation of a model.

Mock-ups: A mock-up refers to a specialized model or working replica of the object being depicted. In a mock-up, a certain element of the original reality is emphasized or highlighted to make it more meaningful for the purpose of instruction. While a model is a recognizable imitation of an object (though larger or smaller than the original one), a mock-up may or may not be similar in appearance. Mock-ups of aeroplanes, auto-mobile engines, bridges, ships and tunnels, etc., may be demonstrated for explaining their structure and actual working. Mock-ups are often used in technical institutions for training purposes.

Dioramas: A diorama is a three dimensional scene in depth incorporating a group of modelled objects and figures in a natural setting. The diorama scene is set up on a small stage with a group of modelled objects kept on the foreground which is blended into a painted realistic background. Dioramas are very effective in the teaching of biological and social sciences.

Source of three dimensional objects

1. These objects may be borrowed from audio-visual aid centres, libraries and museums.
2. They may be purchased from the concerned commercial establishments.
3. They may be prepared by the teachers and students.

Selection and use of three dimensional objects

1. Dimensional aids may be selected, keeping in view of the instructional needs and requirements.
2. As far as possible, they should be a true representative of the actual objects.
3. The complexity of the aids should match the level of maturity of the students.
4. The aids should make an appeal to as many of the five senses as possible.
5. As far as possible, aids should be prepared by the students under proper supervision of the teacher.
6. Every possible effort should be made to prepare students educationally as well as psychologically for receiving instruction or message to be conveyed by the use of these aids.
7. Aids should be inexpensive.

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8. Aids should be prepared with locally available material as far as possible.
9. Necessary instructions should be given to students to handle aids with care.
10. Necessary clarification may be given by the teacher at the presentation of these objects in the class.
11. Necessary demonstration in the use of these aids should be given to students.
12. Students comprehension should be properly tested at the end of the use of aids.
13. Adequate storage arrangement should be made for their safe custody.

Meaning and significance

Nelson Henry has very rightly observed in *Media and Symbols,* 'Educational institutions, left to themselves may not be successful in achieving the educational objectives of the developing societies without the support of the new media.' New media, implying mass media, as channels of education gain relevance from their capacity to disseminate information to a great number of people (masses) and make the present educational programmes more effective and meaningful.

According to Marshall McLuhan whose books *The Gutenberg* and *Understanding Mass Media* throw a lot of light on the subject of mass media—it is the medium which is the message. This means that the medium by which a piece of information or knowledge is communicated to us exerts a profound influence on us. The effec-tiveness of a piece of information depends upon the medium through which it is imparted. McLuham thinks that electronic media affect the sensibilities greatly because they tend to massage the senses. Thus, the medium is not only the message but also the massage because it massages the sensory organs and stimulates them to respond actively. Therefore, it is important that the mass media be utilized in classroom teaching so that the students may obtain sensory stimulation as a part of the process of instruction.

As observed by Wilbur Schramm in his book *Big Media-Little Media*, mass media can be used in education 'as support models in two basic but overlapping ways.'

1. They can be made part of environment into which learning activities are designed as seen in distance teaching institutions.
2. They can be brought into the environment as indirect partners or as tools in the hands of the teachers, by supplementing additional or supportive information that is educationally important and useful.

Mass media are means of impersonal communication via some medium, imported through mediated situation. Mass media are means or instruments of communication that reach large number of people or pupils with a common message. The matter may be printed like newspapers or it may take the form of radio, television and cinema. Carlton W.H. Erickson observes, 'In recent years, technology has swept through society from research laboratories into manufacturing, communications, the space age, and finally now, into education.'

In early times, the teacher was the only medium of communication for children. He taught his students orally. During the course of time the invention of the printing

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press led to the printing of books. Then came newspapers. Now for quite some time new mass media like radio and TV are increasingly used in education. They reach large members and also help in improving the quality of education.

Schools and colleges for long have been the sole medium for imparting information and aiding in the acquisition of knowledge. But with the technological development and fast expanding knowledge, new avenues of education have come up. These media disseminate information which the schools no longer possess but needs to be integrated into the teaching-learning process.

The National Policy on Education 1986 and modified in 1992 has observed, 'The media has profound influence on the minds of children. The mass media make the constraints of time and distance manageable. Modern educational technology must reach out to the most distant areas and the most deprived section of beneficiaries simultaneously with the areas of comparative affluence and ready availability.'

Mass media serve some important functions. They are helpful in reaching large number of people. They are helpful in the spread of compulsory education and adult literacy. Recently their use has increased in distance education. They are useful in making instruction more effective and meaningful.

The use of radio, supplemented by correspondence programme has proved to be very successful in Kenya. Radio forums as a means of adult and continuing education have proved to be extremely successful in Canada, India, Nigeria, Sweden, Tanzania and many other countries.

It is sometimes felt that the mass media tend to diminish the importance of the teacher. It is also claimed in certain circles that they are likely to replace classroom teachers. A close look at the use of these media of education indicates that they are supplementary media. A lot of work by way of pre-telecast, during telecast and post telecast remains to be done by the teachers. Many gaps are to be filled up by them. In spite of the explosion of technological media in the developed countries, the teacher still occupies the place of importance. Fears about the replacement of teachers are unfounded.

6.3.11 Radio's School Broadcast Programmes

There is hardly any doubt regarding the potential of radio as an instructional aid. Frederic Wittis has rightly remarked: 'I like to think of education by radio as a timely, vital and dramatic thing; a system of learning or acquiring more information, a means of widening one's horizon or enriching one's life and breaking down prejudices through inspiration and not perspiration; an education by desire and not by discipline; a pattern or swiftly changing pictures, events with keen interpretations, not statistics and formulas; a moving panorama of the world in which we live—right now, while we are living in it—not a dreary drill of textbooks and tests. In short I feel that one of the most helpful contributions of broadcast to education and one of its real responsibilities to itself and its listeners is the popularizing of education itself.'

R.G. Reynolds writes: 'Radio is the most significant medium for education in its broadest sense that has been introduced since the turn of the century. As a supplement to classroom teaching its possibilities are almost unlimited. Its teaching possibilities are not confined to five or six hours of the school. It is available from early morning to

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midnight. By utilizing the rich educational and cultural offerings of radio, children and adults in communities, however remote, have access to the best of the world's stores of knowledge and art. Some day its use as an educational instrument will be as common place as textbooks and blackboards.'

Merits

1. Bringing the school into contact with the world around
2. Helping in the spread of elementary education
3. Helping in the promotion of adult education
4. Assisting in the spread of non-formal education
5. Enrichment of school programme
6. Furnishing up-to-date material
7. Developing critical thinking
8. Developing leisure time interest and appreciation
9. Providing opportunities for student participation
10. Providing an alternative approach to the education of out of school children
11. Imparting vocational skills
12. Popularizing science with a view to develop a scientific outlook
13. Promoting emotional and national integration
14. Providing information about population education, energy conservation, and preservation of wild life
15. Serving as a training component for teachers.

Demerits

1. Radio broadcast is a one-way communication. Students cannot put questions to the broadcaster.
2. The educational value of radio broadcasting depends merely on the use of sense of hearing.
3. The students have little opportunity to participate in the instructional activity. They are passive listeners for most of the time.
4. In several cases, broadcasting time does not suit all educational institutions.
5. The number of receiving sets is not adequate in the case of several educational institutions.
6. It becomes very difficult to integrate school programmes with radio broadcasts.
7. continuous listening on the part of the students may make them inattentive and uninterested in the task of gaining learning experiences.
8. Usually there is paucity of adequate pre-information, manual or guides regarding radio broadcasts with the result that the students and teachers both face difficulties in making necessary preparation for the utilization of these programmes.

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Suggestions for effective school broadcasting programmes

1. The school broadcasts should not be merely course lessons but should have a wider horizon of application in day-to-day life.
2. The school broadcasts should be planned according to the needs of the syllabus, students and concerned teachers.
3. Teachers should occasionally meet, discuss and plan the type of assistance required on mass media instructional facilities.
4. The radio programmes should be intended to give supplementary information to various topics in the syllabus.
5. Good planning and administration is highly needed so as to make the programmes effective and worthwhile.
6. Broadcasting tune should be suitable to schools. Adequate feedback should be provided.
8. There should be proper follow-up on school broadcasting programmes.
9. Adequate listening facilities should be provided in schools.
10. Broadcasts should be made in easy and simple language.
11. Broadcasts should be made in a pleasing style.

In short all the six main stages of a radio broadcast namely, production, preparation, listening to the programme, feedback, consolidation of acquired knowledge and evaluation should be carefully attended to.

History: Ever since the start of school broadcasting by British Broadcasting Corporation (BBC) in 1920, it has made rapid strides in making sound contribution to formal education. In USA, in 1923, there were programmes in accounting from New York programmes in arithmetic and literature from Oakland in 1924 music appreciation lessons in 1925 from Cleveland. By 1952–20 states in USA had provision for educational broadcasting. Around the same time about 98 per cent of the schools in the UK were equipped with radio and therewere regular daily programmes.

Bombay Station started broadcasting programmes of special interest to school children occasionally from January 1929. From April 30, the Corporation of Madras had regular school broadcasts for half an hour on all weekdays. Similar programmes were introduced by the Calcutta Station in 1932.

The programmes for schools produced by Akashwani Stations are for the following categories of people: (a) children of primary classes; (b) children of secondary and higher secondary classes; (c) preparing lessons for secondary and higher secondary classes near examination time; (d) teachers; (e) general enrichment programme for children.

These broadcasts can either be 'live' or 'transcribed' depending on the physical presence of the person broadcasting or his recorded speech. Broadcasting organizations throughout the world, including AIR, include in their output various school broadcasts. Such programmes are normally arranged in consultation with the heads of various institutions. This liaison between the radio and educational authorities helps in bringing

out effective and useful programmes for the pupils. The planning of such talks is undertaken with great care and by persons of repute. The programmes are prepared termwise and copies are supplied to schools sufficiently in advance to enable the teachers to discuss the subject with the pupils.

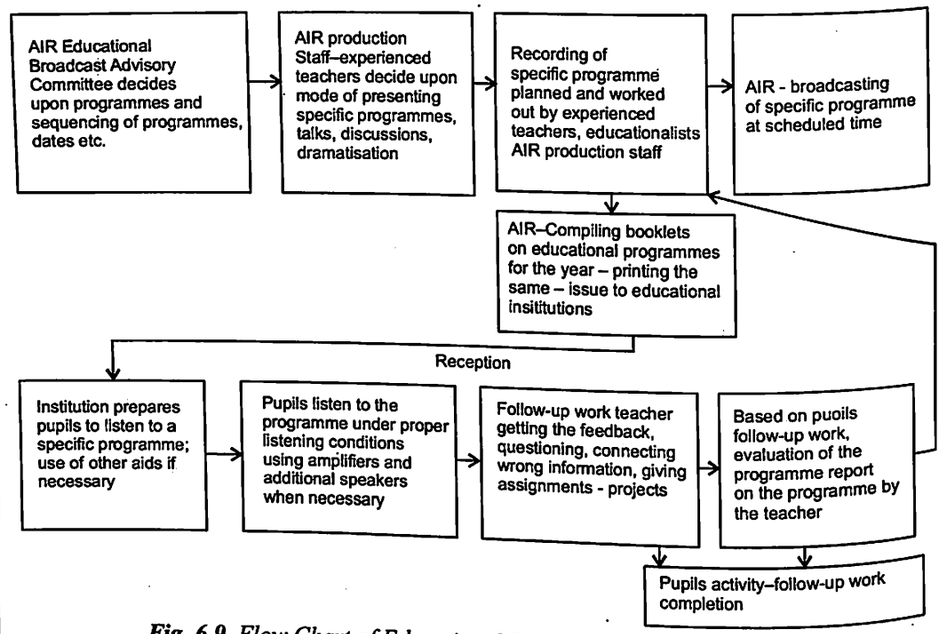


Fig. 6.9 Flow Chart of Educational Broadcast Programmes in India

6.3.12 Educational Television (ETV) or Instructional Television (ITV)

TV has become a child's third parent and a first teacher. The history of television shows that it is a very powerful, informative, socializing and mobilizing force. Most of the countries of the world have opted for television to solve their difficulties and problems relating to education. Direct television instruction started four decades back in progressive countries like the UK and the USA. The regular programmes were on air in November 1936 by BBC. Remote areas were provided with television sets. By 1958 more than 98 per cent of the population was covered by television transmission. By 1961 Moscow and the UK shared programmes with each other. By 1962 American engineers, succeeded in bouncing television waves across the Atlantic on a Satellite-Telestor. In 1967 the first regular service of coloured television in Europe began on BBC-2.

For the first time, television for instructional purposes was used in the USA. A large number of experiments in instructional television were conducted there. In 1958, a project entitled continental classroom started instructional television for the whole of the USA. It telecasted a programme *Physics of the Atomic Age* for science teachers. About 40,000 teachers received instruction through this programme. Later on, several programmes such as modern chemistry, contemporary mathematics and new biology were also telecast by this project. In 1961, a project called *Mid-west Airborne Instructional Television* started instructional television. About 13,000 schools received the programmes benefiting about five million students, at a cost of 7.5 million dollars or at an expenditure of 1.5 dollar per student. At present there are hundreds of instructional television programmes being telecast in USA and other countries.

Significance: Television is the most potential instrument in educating masses and thereby narrowing down the gap of progress between the developing and developed countries of the world. For a country like India which has vast and inaccessible areas, different climatic conditions, large and ever growing population, T.V. can be an important central media in providing functional, formal and non-formal education to the masses. It can also help in bringing about social and cultural changes bearing on art, music, drama and literature. It is through television that stimulating and thought-provoking views of renowned statesmen, scientists, educationists, artists and teachers can be shared by all. Television helps in enforcing the public understanding of social, political and scientific advancement of a country.

Merits

1. It permits the use of the best available teacher to teach a subject for a large number of student viewers. It preserves the expert teaching skills of such teachers on video tape or film for later use.
2. It provides a common experience to all students when they all see the same basic ideas or techniques on television.
3. It provides the teacher an opportunity to observe the instructional methods and ideas of their experts and to increase his own knowledge of teaching methods and stimulate new ideas.
4. It provides technical advantages not readily available in normal classrooms for illustration or demonstration.
   (a) It makes possible close-up magnification of small objects, components, intricate mechanisms, diagrams, etc., giving student a 'front-row seat.'
   (b) It allows instantaneous change of perspection by switching from a wide camera angle to a close-up or by 'zooming' in.
   (c) It permits relationships between two illustrations or time-lapse between two stages of a process by dissolving one picture into another.
   (d) It provides for comparison of two or more illustrations by superimposure or 'spilt screen' effects.
5. It directs the attention of the student to the exact detail of object which he should see by eliminating distracting surroundings.
6. It makes quick and lasting visual and rural impressions which can often reduce the time necessary to teach an idea or technique.
7. It makes it possible to bring large, scarce, new or confined equipment 'into the classroom' electronically.
8. It incorporates useful film sequences, slides, graphic art and makes available teaching aids within a television presentation, tailored to meet the needs of a particular course or subject.
9. It saves time, effort and cost of setting up classroom projection equipment.
10. It brings instructional films into classrooms as needed with no special classroom preparation, no darkening of rooms or use of special ventilation in the room.
11. It provides more 'immediacy' than instructional films.

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12. It brings live demonstrations, video-tape or film presentations to the classroom at the instant or immediately after they occur.
13. It permits inclusion of up-to-date information, modifications, new equipment or techniques into the classroom instruction.
14. It allows the teacher time to observe individual students or to assist them during the television presentation, or to determine what needs further application after the presentation.

Limitations of ETV

1. The medium is limited to one-way communication from teacher to students. Students cannot put any question.
2. The total cost of teaching by television is more than normal classroom instruction, unless television is used to reach large number of students at one time or sequentially over a period of time.
3. Television has special and unique techniques and requires occasional re-arrangement of subject sequence.
4. Individual differences of the students are not attended to in a TV lesson.
5. TV lessons may not suit the school timings.
6. TV lessons are not flexible.
7. Instruction through TV is not child or learner centred.

Kinds of educational TV programmes

1. Total TV teaching.
2. TV as a complementary basic resource.
3. TV as a supplementary environment.

Role of the teacher in school TV programmes

School TV programmes have five main stages and it is necessary that the teacher should be associated with each stage.

1. Planning and Preparation
2. Presentation
3. Production
4. Utilisation
5. Evaluation

1. ***Planning and preparation of programmes:*** No TV programme for schools can be planned and prepared unless the classroom teacher is effectively associated with this work. To plan and prepare a good TV lesson, a thorough knowledge of the requirements of the students of different age levels, the suitability of the materials, the sequence and the contents are very vital and this can be met fully only by the classroom teacher. Experience tells that the classroom teacher can contribute effectively in this area if he has a good grounding and knows very well the mechanics of a good TV lesson.

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2. ***Production:*** Production is a technical thing but the knowledge about the mechanics of production must be known to the classroom teacher if he is to appreciate a good lesson, i.e., to locate its strong and weak points and suggest improvements.
3. ***Presentation:*** Again, in the presentation of a TV lesson it is only the classroom teacher who can deliver the goods—no doubt a teacher with initiative, imagination and subject competency is required. The presentation involves only a selected number of teachers but the scope of selection involves all the teachers of a subject. A good selection can be possible only from a TV trained group. It is noted that without necessary training in this field even a very good and competent teacher in a school fumbles and stumbles in the studio.
4. ***Utilisation of TV programme and the teacher—Pre-telecast and post-telecast:*** Utilization is the area where the teacher is the master of the situation. It may be emphasized that no TV lesson is complete without the introduction and follow-up exercises in the classroom by the subject teacher. An average lesson with proper and well-thought introduction and follow-up can become a very effective lesson whereas a good lesson in the absence of one or both can go flat. The teacher has to inspire the students, prepare them and arouse their curiosity before the telecast of the lesson and afterward has to clarify the doubts, if any, provide the missing links and reinforcement in the follow-up. He also has to integrate the TV lesson with his classroom teaching. He also has to take care of many other factors and provide congenial conditions to enable his students to really benefit from a TV lesson.
5. ***Evaluation:*** Evaluation is another important area. If tackled properly, it contributes consid-erably to the quality and usefulness of TV lessons. No evaluation is possible or worthwhile without the involvement of the classroom teacher. Moreover, simply involvement of the classroom teacher does not help much unless he is fully conversant and properly trained to evaluate and assess the TV lesson from all angles and has acquired competency to do the job well. Without proper training the teachers even fail to fill up the check- sheets properly—an exercise to be completed by the classroom teacher after every lesson.

Physical facilities for effective television education

Once the television becomes an integral part of classroom teaching, the physical facilities available in the schools are as important as the quality of the programme, from the utilization point of view. No matter how rich and valid the TV programmes are, they cannot reach the audience unless optimum physical facilities are available to the viewers. The availability of physical facilities appears to be quite simple yet it requires a constant vigil to keep them all in operational readiness.

Broadly speaking we can classify the physical facilities into three categories:

(a) Space and seating arrangements
(b) TV sets, antenna and other accessories
(c) Literature

(a) In each TV viewing school suitable space area must be earmarked for television viewing depending upon the number of viewers. Ideally speaking each class that has to view a TV lesson, should have TV set, fitted in the classroom itself but

it is not possible. Therefore, provision of a room, which can be converted into a TV room should be made. Hall is another alternative for large number of viewers. Other points to be taken care of are:

(i) Placement of TV set and its adjustment.
(ii) Seating arrangement.
(iii) Lighting.
(iv) Ventilation.
(v) Space for demonstration, pre-telecast and post-telecast activities.

(b) It is needless to say that the TV sets should always be in operational condition so that these can be switched on at a very short notice. The various factors that put operating off are:

(i) Defective power points and plugs
(ii) Defective Antenna
(iii) Misadjustment of TV controls
(iv) Major defect in the TV
(v) Voltage fluctuations
(vi) Operational procedures like locked cupboards etc.

(c) The school television programmes by and large are syllabus-based programmes and therefore the students must know the connecting links between their classroom teaching and the television programmes. These should reach the classroom teacher in the beginning of the session or term as the case may be.

Films

Broadly speaking, a film is a multiple media of communication. It presents facts in a realistic way, dramatizes human relations, arouses emotions and transmits attitudes. It may be used for the communication of ideas, attitudes and experiences to the masses of people. It is very effective in adult education. An educational film has been described as the greatest teacher because it teaches not only through the brain but through the whole body. It has a very powerful influence on the minds of children and in shaping their personality. The main aim of educational films is to elevate and educate them according to the patterns and principles set by the society. A good educational film should help the students to develop a sense of citizenship. A film on national integration can be prepared to help inculcate ideas of oneness and unity. 'Live and Let Live' can be the theme. A variety of topics—historical, biographical and of current interest can be covered.

Some of the main advantages of motion pictures are given below:

Increased reading interests of the students: Various investigations conducted in USA show that film producers arouse increased reading interest in children. They are stimulated to get more information about the fact they have been observed in a film show.

Real learning situations: The film puts before us the learning situations which look to be quite real and actual. The child sees something happening and his experience is direct. Therefore, he is deeply impressed.

Selected learning situations: A child learns from his actual life experience more than he learns from the lessons which he gets passively in the school. But life experience comes as a routine. Sometimes it has no educative value. Sometimes, it may have an adverse influence. But in an educational film, all the learning situations are the selected ones. They have a great educational value.

Quickness of movement: The events in a film show run very swiftly but without losing continuity and essence of development. Therefore, the effects are also received swiftly in a concentrated form.

Vividness: The learning situation is quite vivid. Everything is happening in such a way as if it is more than living and actual. All the activities are quite vivid.

Motivation: The film motivates teaching. The child takes a great interest. A long study of many weeks may not be able to bring home the facts of the French Revolution to a child but he will at once understand and learn everything about the movement if he is shown a film of the events.

Recreation: A film show is recreational as will. Thus, he learns through play. He feels light and happy after the show.

Development of study habits: Educational films develop study habits as children like to know more about the facts they have learnt in the show.

Illustration of all learning situations: We cannot give an adequate idea of an ocean to a child who has never seen even a lake. A child cannot understand what a mountain is like if he has never come across a hill in his life. But it is not possible for us to take every child to the ocean and mountains, to the deserts and valleys, to the Tundras and the Tropics. The film serves us here wonderfully. It brings the ocean, the mountains, the deserts, the valleys, the Tundras and the Tropics, all in their form and with all their grandeur into the school hall.

Charles F. Hoban and E.B. Ormer summarize the educational advantages of films as: means of imparting information, development of skills, development of attitudes, enlarging interests and development of the will to solve problems.

Disadvantages

1. Educational films sometimes include an element of fiction in historical events.
2. Recapitulation is not possible on the spot. Sometimes the teacher likes and the pupils too wish to dwell longer on a particular shot in the show. But the film does not wait; it goes on.
3. Really good educational films are not available in our country.
4. The whole process is very costly. All the schools cannot afford to have good halls, the projectors and other equipment for the purpose.
5. It may have some bad effect on eyesight.
6. Generally teachers are not trained in handling handle the projectors and organizing shows.
7. It needs electricity. Many village schools have no electricity.

Suggestions for making the optimum use of educational films

The most important point to be taken into consideration is that the film must be relevant and purposeful.

When a film show is going to be arranged, the teacher should see that it is really needed in connection with the topic which being taught. He must discuss the background of the learning situations to be presented in the film show, prior to the presentation. It should serve the purpose of recapitulation. The whole process may be arranged in the following steps:

1. Preliminary talk about the film.
2. Presentation of the film.
3. Discussion and follow-up on the film.
4. Recapitulation and recording of salient features.

Children's Film Society

The Children's Film Society India (CFSI) was established in 1955 as an autonomous body with the objectives of promoting and encouraging the Children Film Movement in the country. It also aims at providing children and the young people, films with clean and healthy entertainment. The organization is engaged in production, acquisition, distribution and exhibition of the films suitable for the children and young people. The main office of the society is in Mumbai and zonal offices are in New Delhi, Chennai and Kolkata. Since its inception, the society has produced and purchased about 100 feature films and 104 short films.

A pilot project to reach the rural children in Maharashtra by means of Mobile Film Unit has been in operation for a number of years. Four children film clubs are functioning, viz., one in Kolhapur (Maharashtra), two in Porbandar (Gujarat) and one in Mumbai.

The society organizes film festivals and participates in important international film festivals abroad. In India, the first international film festival was organized in Bombay in 1979. In 1981, the Indian festival was accorded 'A' category status by the International Centre of Films for Children and Young People (ICFCYP), Paris. The society has set up a National Centre of Films for Children affiliated to the International Centre of Films set up at Brussels under the sponsorship of UNESCO. Some of the important films a teacher can make use are: (1) *Scout Camp* (2) *Guru Bhakti* (3) *Ganga Ki Lahren* (4) *Bachon se Batten* (5) *Gulab Ka Phool* (6) *Ekata* (7) *26 January*.

Press as medium of education

The press is an informal but a very influential agency of education. The press includes newspapers and magazines. They provide a variety of information. They cover almost all areas of knowledge. They keep us well-informed. They are very useful in the teaching of various subjects. Instruction through newspapers introduces variety and an element of 'play-way'.

'The newspapers are very useful for the study of languages. Pupils learn many new words and many new expressions. They learn how to express themselves and how to follow the expression of .others. As regards social studies they learn how the society is developing day by day. They learn a lot about the society. There is much geographical and scientific information available in daily papers and magazines.

For international understanding the study of newspapers is essential. Children come to know how the world is progressing, how we are woven internationally, how the events occurring in one country affect all the other countries of the world and how we shall have to suffer if a third world war breaks out.

6.4 SUMMARY

In this unit, you have learnt that:

- In 1946, Edger Dale developed the theory that a student is able to remember more information when they perform any task as opposed to what they hear, read or observe. His research led to the development of the 'cone of experience'.
- The original labels for Dale's ten categories are: direct, purposeful experiences; contrived experiences; dramatic participation; demonstrations; field trips; exhibits; motion pictures; radio – recordings – still pictures; visual symbols; and verbal symbols.
- While using the Cone theory, it should not be interpreted as indicating that tasks such as reading, listening and viewing experiences should not be put in practice.
- The real-world experiences at the bottom of the Cone relate directly to the 'proving it' stage; it is at this stage of the model that students are encouraged to use what they have learned in new, real-life contexts.
- Media includes such things as prints, graphics, photography, audio-communication, television, simulating games and computer.
- In addition to reading, vicarious experience can be gained from still pictures, films, filmstrips, resource persons, simulations, mock-ups, television, and the like. The more concrete and realistic the vicarious experience, the more nearly it approaches the learning effectiveness of the first level.
- Audio-visual aids or devices or technological media or learning devices are additional devices that help the teacher to clarify, establish, co-relate and co-ordinate accurate concepts, interpretations and appreciations and enable him to make learning more concrete, effective, interesting, inspirational, meaningful and vivid.
- Some of the principles in the use of teaching aids are: (i) principle of selection (ii) principle of preparation (iii) principle of physical control (iv)principle of proper presentation (v) principle of response (vi) principle of evaluation.
- Some of the problems in the use of teaching aids are: (i) apathy of the teachers (ii) indifference of students (iii) ineffectiveness of the aids (iv) financial hurdles (v) absence of electricity (vi) lack of facilities for training (vii) co-ordination between the centre and states.
- Educational technology can be classified into two categories, i.e., the hardware approach and software approach.

Check Your Progress

3. List some of the characteristics of good teaching aids.
4. Name the hardware devices which are used as teaching aids.
5. What are some of the points that need to be kept in mind while using the blackboard?
6. Name the different kinds of charts that can be used for teaching-learning process.
7. What are the sources of three dimensional objects?

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- Blackboard is a unique device which in spite of newer and better devices in vogue is irreplaceable as well as indispensable. It is the oldest and the best friend of a teacher.
- Different types of blackboards are: (i) fixed blackboard (ii) blackboard on easel (iii) roller blackboard (iv) graphic board.
- A chart is a combination of pictorial, graphic, numerical or vertical material which presents a clear visual summary. The most commonly used types of charts include outline charts, tabular charts, flow charts and organisation charts.
- The epidiascope is an instrument which can project images or printed matter or small opaque objects on a screen.
- A film strip is 35 mm wide and has a series of 12 to 48 picture frames arranged in a sequence so that they develop a theme.
- Graphs are flat pictures which employ dots, lines or pictures to visualize numerical and statistical data to show relationships or statistics.
- Magic lantern is the earliest invention in the history of audio-visual aids used for projecting pictures from a transparency (slide) on a wall or screen.
- Different types of maps are (i) relief maps (ii) historical maps (iii) distribution maps (iv) geographical maps.
- The microfilm and microfiche are used widely for storage and retrieval of information. Microfilms contain photographed reading material on a 35 mm film, each frame being the reduced photograph of a printed page.
- A model is a three-dimensional representation of a real thing. Models are concrete objects to explain clearly the structure or functions of real things. A model is a replica of the original. Models enable students to have a correct concept of the object.
- Different kinds of projectors are: (i) Micro-projector (ii) Overhead projector (iii) Slide projector.
- Reprography is a branch of technology dealing with methods of duplication or reproduction.
- Record players are a means of audio playback. They are older types of hardware using records of discs for the needed playback.
- Three dimensional aids serve as good substitutes for the real objects. Models diagrams, mock-ups and specimens are the important three dimensional aids.
- Most of the countries of the world have gone for television to solve their difficulties and problems relating to education. Direct television instruction started four decades back in progressive countries like UK and USA.
- Television is the most potential instrument in educating masses and thereby narrowing down the gap of progress between the developing and developed countries of the world.
- Once the television becomes an integral part of classroom teaching, the physical facilities available in the schools are as important as the quality of the programme, from the utilization point of view.

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- A film is a multiple media of communication. It presents facts in a realistic way, dramatizes human relations, arouses emotions and transmits attitudes. It may be used for the communication of ideas, attitudes and experiences to the masses of people.
- The Children's Film Society India (CFSI) was established in 1955 as an autonomous body with the objectives of promoting and encouraging the Children Film Movement in the country. It also aims at providing children and the young people, films with clean and healthy entertainment.

6.5 KEY TERMS

- **Audio-visual aids:** Are those sensory objects which initiate or stimulate learning.
- **Chart:** A chart is a combination of pictorial, graphic, numerical or vertical material which presents a clear visual summary.
- **Epidiascope:** The epidiascope is an instrument which can project images or printed matter or small opaque objects on a screen.
- **Graphs**: Are flat pictures which employ dots, lines or pictures to visualize numerical and statistical data to show relationships or statistics.
- **Micro-projector:** The combination of a microscope and a slide projector is an instrument called micro-projector.
- **Overhead projector:** Is a device that can project a chart, a diagram, a map, a table or for that matter, anything written on transparent plates, upon a screen or the white wall before students in a class.

6.6 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Learning by doing is known as experiential learning or action learning.
2. The original labels for Dale's ten categories are: direct, purposeful experiences; contrived experiences; dramatic participation; demonstrations; field trips; exhibits; motion pictures; radio – recordings – still pictures; visual symbols; and verbal symbols.
3. Some of the characteristics of good teaching aids are:
   (i) They should be meaningful and purposeful
   (ii) They should be accurate in every respect
   (iii) They should be simple
   (iv) They should be cheap
4. Some of the hardware devices which are used as teaching aids are:
   (i) Computers
   (ii) Epidiascope
   (iii) Magic lantern
   (iv) Motion pictures

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(v) Overhead projector
(vi) Radio
(vii) Slide and Film projector
(viii) Tape recorders

5. Some of the points that need to be kept in mind while using the blackboard are:
   (i) Blackboard should be kept clean so that writing on it could be easily read by the students from all parts of the room.
   (ii) Writing on the blackboard should be legible.
   (iii) Writing should be in straight rows.
   (iv) Extreme lower corner of the blackboard should not be made use of as writing on it cannot be seen easily.
   (v) Material on the blackboard should not be covered by standing in front of it.
   (vi) Only salient points of the subject-matter should be written on the blackboard.
6. The different kinds of charts that can be used for teaching-learning process are:
   (i) The narrative chart
   (ii) The tabulation chart
   (iii) The cause and effect chart
   (iv) The chain chart
   (v) The evolution chart
7. Some of the sources of three dimensional objects are:
   (i) These objects may be borrowed from audio-visual aid centres, libraries and museums, etc.
   (ii) They may be purchased from the concerned commercial establishments.
   (iii) They may be prepared by the teachers and students.

6.7 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are audio-visual aids?
2. What is the significance of audio-visual aids?
3. What are the characteristics of good teaching aids?
4. What are the problems in the use of teaching aids?
5. Write short notes on (a) epidiascope (b) film strip (c) graphs.
6. Identify the various aspects of maps.
7. Write short notes on (a) microfilm (b) models (c) projectors.
8. What do you understand by three dimensional aids?
9. What is the significance of educational television?

Long-Answer Questions

1. Explain Edgar Dale's 'cone of experience.'
2. Elaborate the advantages of audio-visual aids.
3. Describe the use of blackboards in the teaching-learning process.
4. Identify the different types of charts? Also mention the uses of charts.
5. Explain the use of models, mock-ups and dioramas in the teaching-learning process.
6. What are the merits and demerits of radio school broadcasting programmes?
7. Describe the role of the teacher in school television programmes.

6.8 FURTHER READING

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UNIT 7 BEHAVIOURAL TECHNOLOGY

NOTES

Structure

7.0 Introduction
7.1 Unit Objectives
7.2 Modifications of Teaching Behaviour
  7.2.1 Micro Teaching
  7.2.2 Simulation Social Skill Training (SSST)
7.3 Flander's Interaction Analysis (FIACS)
7.4 Summary
7.5 Key Terms
7.6 Answers to 'Check Your Progress'
7.7 Questions & Exercises
7.8 Further Reading

7.0 INTRODUCTION

Teaching behaviour refers to the behaviour demonstrated by a teacher at the time of carrying out teaching activities in the classroom. A teacher's behaviour is exhibited through skills used by him in a classroom. These skills are known as 'teaching skills'.

Micro teaching is a brilliant method for developing aptitude and self-confidence to experience a variety of lecturing/tutoring approaches, and become skilled in providing constructive feedback. It offers instructors with an opportunity to safely let themselves be scrutinized by a small group of audience. They can also scrutinize and comment on other people's performances. In order to prepare teachers, micro teaching trainings are supported by video-recordings. In a sheltered atmosphere of friends and colleagues, it is easy for teachers to practice what they usually do with their students and get expected positive feedback. A micro teaching session is an opportunity to take on new teaching and learning strategies, and as a student learns about his requirements and expectations. It facilitates learning from others and enriches one's own teaching methods.

According to Flanders, teaching is interactive in nature. When teachers and students interact, they participate in the process of teaching. In this process, students are also influenced by the teacher. Students also interact among themselves. Thus, the process of teaching is where every person interacts with every other person in a class. Simulation is an important strategy of teaching where complex and changing situations are illustrated. They are simpler, in comparison to the actual situations that they represent. In simulation, language is used to make students learn and develop ideas about the world. It prepares them with crucial skills for thinking and leadership.

In this unit, you will learn about micro teaching, simulation social skill training (SSST) and Flander's interaction analysis (FIACS).

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7.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Differentiate between teacher behaviour and teaching behaviour
- List the chief characteristics of teaching behaviour
- Interpret micro teaching
- State the characteristics of micro teaching
- Analyse the micro teaching cycle
- Compare micro teaching and traditional teaching
- Explain some of the important skills of micro teaching
- List the advantages and disadvantages of micro teaching
- Discuss Flander's interaction analysis

7.2 MODIFICATIONS OF TEACHING BEHAVIOUR

Behaviour of the teacher in general and in the classroom in particular has a great bearing on the development and shaping of the behaviour of the students and in their participation in the teaching-learning process. A teacher's behaviour has two components: verbal as well as non-verbal. According to Ryans (1969), teacher behaviour is the behaviour or activities of persons as they go about doing whatever is required of teachers, particularly those activities which are concerned with the guidance or direction of the learning of others.

Mc Nergency and Carner (1981) regard teacher behaviour as a function of the characteristics of the teacher, the environment and the tasks in which the teacher engages.

Teacher Behaviour and Teaching Behaviour: Teacher behaviour has a wider connotation than teaching behaviour—a concept which is of recent origin. Teaching behaviour is a new entry in the field of educational thought and practice. Teacher behaviour includes teaching behaviour with all its activities or acts or operations relevant to the achievement of specific goals of teaching. Teacher behaviour includes personality characteristics, dispositions, attitudes, dominance or submission, sensitiveness or shyness and the number of greetings. Teaching behaviour on the other hand refers specifically to a number of acts or activities of operations of teaching of a teacher in the presence of pupils with the intention of achieving teaching-learning goals. It comprises saying or writing something on the blackboard, explaining, demonstrating, asking questions, responding, reacting, directing, praising, encouraging or reprimanding. The teaching behaviour conceived in this way becomes a system of activities or acts or operations which can be analysed in terms of each specific activity or act or operation. It employs the intellectual process in a well organized form.

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Characteristics of teaching behaviour

Some of the main characteristics of teaching behaviour are given below:

1. ***Teaching behaviour is an interactive process:*** Teaching behaviour is a social phenomenon arising out of the interaction between a teacher (T), a student (S) and a specific content (C). A teacher (T) in his/her teaching behaviour plans, organizes and implements the instructional strategies to bring about appropriate changes in the student (S) by organizing the content (C). The content is also designed as a subject of study or discipline.
2. ***Teaching behaviour is a goal-directed activity:*** A teaching activity loses its relevance and rationality without a specific goal. Behavioural objectives form an important part of teaching behaviour. Behavioural objectives imply the changes that are envisaged to be brought about in the students through teaching behaviour of the teacher. The behavioural objectives of teaching determine the levels of achievement of the students. Teaching behaviour is thus, a goal-directed activity.
3. ***Teaching behaviour includes several skills:*** Teaching behaviour draws heavily from the cognitive powers and scholastic achievements of the person engaged in it. Teaching behaviour includes a variety of cognitive, social, managerial and manipulative skills. The cognitive skills relate to the logical, linguistic and the subject matter control, the social skills involve the manner or method of handling the questions and responses of the students, the managerial skills refer to the particular way in which the problem of relationship or adjustments among students is tackled and the manipulative skills involve the various physical movements or performances which help in focussing attention and arousing motivation and sustaining it. All these skills are interrelated.
4. ***Teaching behaviour is a social act:*** Teaching behaviour exists in a context of social interaction. The acts of teaching lead to reciprocal contacts between the teacher and the pupils and the interchange itself is called teaching.
5. ***Teaching behaviour is a moral act:*** Philip W. Jackson has rightly observed, 'Teaching characteristically, is a moral enterprise. The teacher is out to make the world a better place and its inhabitants better people. He may not succeed of course, but his intention, nonetheless, is to benefit others.'
6. ***Teaching behaviour is a linguistic act:*** Language is an important and critical factor in the effectiveness of the teaching behaviour. Broadly speaking teaching behaviour in the classroom may be sorted out in the following five categories:
   (i) Verbal fluency
   (ii) Optional information amount.
   (iii) Number of principles, concepts, comparisons, and contrasts
   (iv) Interest developing or attention seeking statements
   (v) Vagueness
7. ***Teaching behaviour is a logical act:*** Each variety of teaching behaviour involves logical operations in the form of defining, describing, stating, reporting, substituting, evaluating, opining, classifying, comparing and contrasting, conditional inferring and explaining. Socrates provided us a model for the use

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of logic in instruction. In recent times other logical models were advocated by Dewey, Kilpatrick and Piaget. John Dewey argued that the rules of successful enquiry are in fact, the rules of logic. The concern for enquiry and discovery in problem solving method of education is the contemporary manifestation of the trend of rules of logic.

8. ***Teaching behaviour is a unidirectional activity:*** In a given teaching-learning situation, it is the teacher (T) who tries to influence the student (S). It is very rare that the students influence their teachers. It is, therefore, a one-side directed activity. Direction is from the side of the teacher. Teaching behaviour, is therefore, called a unidirectional activity.

9. ***Teaching behaviour is non-symmetrical:*** Effect of teaching-learning is not the same on the teacher and the students. Rarely do the students intend to influence their teachers. If at all, a teacher is influenced by his/her students, it is just a casual or incidental effect. It is not deliberate. Smith calls the teaching behaviour non-symmetrical as the teacher influences the students and students may 'sometimes but not always' influence the teacher.

10. ***Teaching behaviour is molecular rather than molar:*** Teaching behaviour is a series of activities organized into a harmonious whole. It is, therefore, called molecular. 'Molecular' concept of teaching behaviour refers to the plurality of activities. Teaching behaviour is not a single operation and hence not 'molar'. Teaching behaviour involves a number of operations or activities such as speaking, demonstrating, asking questions, response by the students and so on.

11. ***Teaching behaviour has three stages:*** The three stages of teaching behaviour are: (i) pre-active, (ii) inter-active, and (iii) post-active. In the pre-active stage, there is no face to face encounter between the teacher and the student. The teacher prepares the blueprint of the acts or activities or operations of teaching to be carried out during his teaching in the class. All these activities are planned behind the scene. The second stage is very crucial in the teaching learning process. It is a face-to-face encounter. Here both the teacher and the students are active. This stage consists of activities which the teacher performs with the pupils. The post-active stage comprises activities of the teacher after the inter-active stage. The teacher no longer faces the pupils at this stage. The teacher is concerned with the retrospective analysis of the events, or incidents which occurred during the inter-active stage.

12. ***Teaching behaviour is a dynamic act:*** Teaching behaviour is dynamic in nature for it is not concerned with mechanical or static situations. It is concerned with human beings who feel and act differently in different situations.

13. ***Teaching behaviour is a complex act:*** Teaching behaviour is a complex act involving a network of skills relating to the control and mastery of the subject matter, communication, evaluation and feedback. For analysing teaching behaviour, we begin with the simple skills as is done in the case of micro-teaching situations.

14. ***Teaching behaviour can be analysed:*** Flander's interaction technique is an important means of analysing teaching behaviour.

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15. ***Teacher behaviour can be modified:*** Teachers are made as well as born. Teaching behaviour is acquired through training as well as experience and as such it can be modified. Some teachers may possess natural capacities or aptitudes but the scope of their modifiability is quite considerable. Situations are not static. They change from time-to-time. So teaching behaviour also needs modification in order to meet the challenges of the new situations effectively. Programmes of teacher training all over the world have been planned on the assumption that it is economically, educationally and psychologically sound to modify teaching behaviour so as to achieve desirable goals. Various strategies used for modifying and improving teaching behaviour are:
    (i) Simulation and gaming
    (ii) Micro-teaching
    (iii) Action research.

Teaching activities are understood as related or sequential pattern of behaviour and not as a discrete or independent set of behaviour.

Sequential pattern of teaching behaviour in the classroom may be described by using the strategic and tactical concepts. It may be kept in view that strategic and tactical concepts are related with each other and are not contradictory or independent.

A strategy denotes a generalized plan of a lesson which includes structure, desired learner behaviour and an outline of planned tactics.

A tactic may be described as a goal-linked influencing behaviour of the teacher—the way a teacher behaves in the instructional situation. A tactic is, therefore, a short term device and it may range from one question or statement to a complex or verbal or purposeful non-verbal teacher behaviour interlaced with student behaviour.

7.2.1 Micro Teaching

A trainee teacher is bewildered by the complexity of teaching a large class of students and finds it very difficult to learn all aspects of teaching at the same time. It is easier for him to practice and learn one skill of teaching at a time. This problem was resolved by a process of training teachers in practical teaching. It came to be known as Microteaching. Micro teaching is an excellent way of helping teachers and students to understand the process of teaching and learning better. It provides constructive feedback which helps teachers scrutinize their own teaching in order to discover their strengths and weaknesses. As a tool for teacher preparation, micro teaching trains teaching behaviours and skills in small group settings, aided by video-recordings. Micro teaching is a kind of real teaching which takes place in reduced time, number of students and range of activities. It provides teachers with ample opportunities to explore and reflect on their own and others' teaching styles and to acquire new teaching techniques.

The history of micro teaching goes back to the mid-1960s when Dwight Allen and his colleagues from the Stanford University developed a training programme. This programme was aimed at improving verbal and non-verbal skills and general performance of teachers. The Stanford model had a three-step approach using actual students as authentic audience. The model was first applied to the teaching of science, but later it was introduced to language teaching. A very similar model called

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Instructional Skills Workshop (ISW) was developed in Canada during the early 1970s. It was a training support programme for college and institute faculty. Both these models were designed to enhance teaching and promote open collegial discussion about teaching performance.

Characteristics of micro teaching

The characteristics of micro teaching are as follows:

(i) Micro teaching is an experiment in the field of teacher education, which has been incorporated in the practice of teaching schedule.

(ii) Micro teaching is a highly individualized training device.

(iii) It is a student teaching skill training technique and not a teaching technique or method.

(iv) The main objective of the micro teaching session is to provide participants with an environment for practice-based teaching and to instil self-evaluative skills.

(v) Micro teaching is a scaled down teaching encounter which reduces the complexities of real teaching such as:
   (i) practising one skill at a time
   (ii) reducing the class size to 5–10 students
   (iii) reducing duration of the lesson to 5–20 minutes
   (iv) limiting the content to a single concept.

(vi) Students are provided with an immediate feedback that helps in improving and motivating learning.

Assumptions of micro teaching

Some of the important assumptions underlying the process of micro teaching are as follows:

(i) Teaching is a complex process but can be divided into simple skills.

(ii) Teaching skills can be practised one by one up to the mastery level, under a specific and simplified situation.

(iii) Appropriate feedback, if systematically given, proves very significant in mastering each skill.

(iv) When all skills have been mastered, they can be integrated for real classroom teaching.

(v) Skill training can be conveniently transferred from simulated teaching situation to actual classroom teaching situation.

Objectives of introducing micro teaching in colleges

Duggal and Sharma have listed the following objectives of introducing micro teaching in colleges:

(i) To initiate trainee teachers to analyse and develop teaching behaviour under laboratory conditions.

(ii) To land novice teachers gradually in the real classroom after gaining enough confidence.

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(iii) To impart intensive training in the component skills of teaching to teacher trainees at pre-service level.

(iv) To involve the academic potential of teacher trainees for providing feedback to peers.

(v) To lessen the workload of teacher educators with the involvement of peer supervisors.

(vi) To lessen the burden on practising schools.

(vii) To explore human resources and economy to the maximum with respect to time, money and materials.

Micro teaching cycle

The six steps generally involved in the micro teaching cycle are: (i) plan (ii) teach, (iii) feedback (iv) re-plan (v) re-teach and (vi) re-feedback. There can be variations as per the requirement of the objective of the practice session. These steps are diagrammatically represented Figure 7.1.

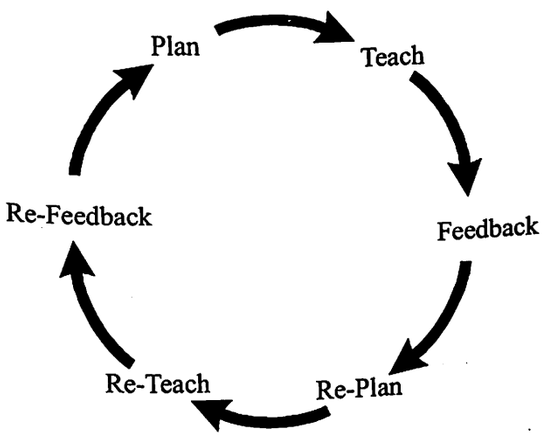


Fig. 7.1 Micro Teaching Cycle

(i) **Plan:** This involves selection of the topic and related content of such a nature, in which the use of components of the skill under practice may be made easily and conveniently. The topic is divided into different activities for the teacher and the students. Activities are planned in a logical sequence where maximum application of the components of a skill is possible.

(ii) **Teach:** This involves the attempts of the teacher trainee to use components of the skill in suitable situations, taking place in the process of teaching. If the situation is different and not as visualized, the teacher should modify his behaviour as per the demand of the situation in the class. The teacher should have the courage and confidence to handle the situation arising in the class effectively.

(iii) **Feedback:** This term refers to giving information to the teacher-trainee about his/her performance. The information includes strength as well as weaknesses related to his/her performance. This helps the teacher-trainee to improve upon his/her performance in the desired direction.

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(iv) **Re-plan:** The teacher-trainee re-plans his/her lesson, incorporating the points of strength, and removing the points not skillfully handled in the previous attempt.

(v) **Re-teach:** This involves teaching the same group of students, if the topic is changed, or a different group of students, if the topic is the same. This is done to remove boredom or monotony of the student. The teacher-trainee teaches the class with renewed courage and confidence to perform better than the previous attempt.

(vi) **Re-feedback:** This is the most important component of micro teaching for behaviour modification of teacher-trainee in each and every skill practice.

The Indian Model of Micro Teaching

After several years of research and experimentation in micro teaching, NCERT concluded that micro teaching can be practised effectively in India without using any hardware, since symbolic and live modelling and verbal feedback have been found to be quite effective. Further, it is not necessary to use school students for micro teaching; peers can act as students which have also been found to be very effective in bringing about improvement in the skill of teaching. NCERT has proposed the Indian model of micro teaching, which has following salient features:

(i) The mode of presentation of theory and modelling is generally done through the written material, lectures, demonstrations and discussions and not through electronic gadgets like VCR, audio-tapes and films. Teacher educators give model lessons on various teaching skills. However, with the increased availability and use of video-camera, new technology in the use of CD for modelling and feedback purposes has been suggested.

(ii) Live observers are used to observe teaching and for providing immediate feedback to student-teachers. Teacher–educator and peers participate in feedback sessions.

(iii) College-based teaching practice is organized under simulated conditions. Peers are used as students instead of real students. Training in role playing is given to student-teachers.

(iv) The micro teaching laboratory can function with minimum facilities according to the available space, material and equipment.

(v) The duration of micro teaching cycle is:

Teach	:	6 Minutes
Feedback	:	6 Minutes
Re-plan	:	12 Minutes
Re-teach	:	6 Minutes
Re-feedback	:	6 Minutes

(vi) Two half cycle lessons are also practised instead of one full cycle. The Indian model has been successfully tried out, and is being used in many universities and teacher education institutions in the country.

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Table 7.1 Comparison between Micro Teaching and Traditional Teaching

Microteaching	Traditional Teaching
Teaching is relatively simple.	Teaching is comparatively complicated and difficult.
The number of students is less. A class consists of a small group of 5–10 students.	The number of students is much more; a class usually has more than 40 students.
There is provision of immediate feedback, which helps the teacher know his drawbacks.	There is no provision of immediate feedback.
The teaching time is 5–10 minutes.	The duration of traditional teaching is 40–45 minutes.
The student-teacher practises only one skill at a time.	The student-teacher practises a combination of skills.
In microteaching, the role of a supervisor is specific and definite.	The role of a supervisor is quite vague in the case of traditional teaching.
The patterns of classroom interaction can be studied objectively.	The patterns of classroom interaction cannot be studied objectively.
Microteaching is done in fully controlled conditions.	This teaching does not take place in controlled conditions.

Teaching skills through micro teaching

We know that micro teaching is a controlled practice which makes it possible to concentrate on a specific teaching behaviour. Competence is acquired in one skill before proceeding to another skill. Micro teaching can be practised only after a teacher's behaviour has been analysed and specific skills of teaching have been identified. A teaching skill is a set of interrelated components of teaching behaviour for realization of specific instructional objectives (Jangira *et al.*, 1982). Allen and associates (1967), at Stanford University identified a set of fourteen skills of teaching. In India, Passi and associates (1974) working at the Centre for Advanced Studies in Education at M.S. University, Baroda, identified twenty-one skills of teaching. Some of the important skills of teaching have been explained below:

(i) **Skill of stimulus variation:** Skills of stimulus variation are used to bring desirable changes of variation in the stimuli used to secure and sustain student's attention towards classroom activities. Some of the things a student-teacher is trained in are the use of movement in a systematic way, use of gestures, development of verbal and non-verbal methods of focusing children's attention, systematic use of pauses, and controlled use of sensory channels. This skill helps to increase active participation, enthusiasm and spirit of study.

(ii) **Skill of introducing the lesson:** This skill is mainly concerned with the establishment of rapport between the teacher and students for involving students in the lesson. The main components of this skill are utilization of previous experience and appropriate devices, maintenance of continuity in the main parts of the introduction and relevance of verbal and non-verbal behaviour.

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(iii) **Skill of explaining:** Explanation is the use of inter-related facts, concepts with a view to develop understanding among the students towards the content under study. In order to become an effective explainer in the classroom, the teacher should practise more.

(vi) **Skill of reinforcement:** Every responding student of the class needs social approval of his behaviour. To satisfy this need, he is always eager to answer every question known to him. If the teacher encourages students, their participation in the class is maximized. The main purpose of the skill is to increase student participation, facilitate learning, motivate the learner, modify undesirable behaviour and develop desired behaviour.

(v) **Skill of questioning:** Questions are helpful in stimulating thinking and hence, significantly contribute in classroom teaching. It helps a teacher in gaining knowledge about the entry behaviour of students, their interest and attitude towards the subject and the topic in hand. Adequate questioning skills may help the teacher in carrying out effective interaction among the students, including motivation and drawing their attention towards teaching.

(vi) **Skill of lecturing:** This skill is concerned with effective presentation of the content. The teacher leaves his impression by using many techniques and tactics through this skill. Sometimes, it is also known as the communication skill.

(vii) **Skill of illustrating with examples:** This skill is mainly concerned with the selection of examples relevant to the concept so that the content under study may be clear and understandable to students. Examples contribute significantly in the teaching–learning process and are helpful in sustaining the attention of students.

(viii) **Skill of classroom management:** Skill of management involves efforts made by the teacher to compel a child to participate actively in classroom activities. In this skill, the teacher supervises the activities of students, sets norms for their classroom behaviour, asks questions, etc.

(ix) **Skill of using audio-visual aids:** Audio-visual aids attract and hold attention of students and makes teaching more interesting and effective. Use of these aids breaks the monotony of ordinary instructions, helps in forming the right mental images, stimulates critical thinking and increases the power of retention.

(x) **Skill of using blackboard:** Blackboard is a very essential component of the teaching–learning process. It is a cheap device and plays a very important role in attracting the attention of students. The skill of writing on the blackboard requires neatness, appropriateness of written work, simplicity and brevity in the points presented, and legibility.

(xi) **Skill of closure:** Closure is attained when major objectives, principles and topics of a lesson or portion of the lesson have been learnt and the students are able to relate the new with the past knowledge. It is more than a quick summary of the portions covered.

Some important skills of micro teaching

(a) Skill of stimulus variation

The main aim of teaching is to bring a desirable change in the behaviour of students. A teacher should always try to make lessons more effective. For this, he should use various methods and techniques. He should present multiple stimuli just to gain the attention of

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students. In these stimuli, the teacher should himself function as a stimulus, in the form of gestures, movement of the body, change in the pitch of voice, change in the interaction style, pausing and sequencing of different aids of teaching. All these aspects act as stimuli in the class. The use of these stimuli during teaching is known as 'skill of stimuli variation.'

Following are the main components of stimulus variation skill:

(i) **Body movements:** Body movements of the teacher play an important role in the class. Body movements should be in balance because their excessive use may distract students and similarly less body movement will make the teacher look like a dull statue.

(ii) **Gesture:** Gestures play a very important role in making the lesson effective. These include facial expression like laughing, raising eyebrows, and emotions. Some other gestures like movement of eyes, nodding and movement of hands also play a significant role in drawing the attention of students.

(iii) **Change in the pitch of voice:** The students feel boredom due to the teacher's speech at the same pitch, and they also get distracted from the lesson being taught. Thus, the teacher should bring about a change in his voice. Too high or too low pitch should be avoided. Important points should be stressed by changing the pitch of voice.

(iv) **Focusing:** It is very important to stress on some specific points or events. This process of focusing includes verbal focusing, gesture focusing and oral-gesture focusing. Verbal focusing draws the attention of the student by using and repeating certain words. Gesture focusing draws their attention by pointing fingers at written words or pictures. In some situations, the teacher uses both of them simultaneously.

(v) **Change in the style of interaction:** In a classroom, interaction between the student and teacher is a must otherwise the classroom environment will become monotonous. But this interaction should be different. It can be between a teacher and the whole class, a teacher and a student or between students. All these types of interactions can be arranged by teachers. A teacher should ask questions in an interactive manner so that his class becomes more interesting and effective.

(vi) **Change in teaching aids:** Different types of teaching aids should be used by the teacher during teaching. This will help in maintaining the attention of the student towards the teacher. He should also use audio and visual aids alternatively.

(vii) **Pause:** The teacher should not talk in the class continuously. There should be regular pauses in the process of explanation in the class. If the teacher speaks continuously, students will get bored. Hence, pauses are important to maintain attention of students.

Thus, we can easily generalize that skill of stimulus variation plays a significant role in teaching, and is utilized by the teacher to make his teaching effective as well as interesting.

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(b) Skill of explaining

Explaining concepts is very important in classroom teaching. Hence, a teacher has to learn the skill of explaining in order to make students understand many ideas, concepts or principles that need explanation. Explanation is nothing but a few interrelated appropriate statements.

The skill of explanation can be developed by using the following components:

(i) **Appropriate statement:** During a lecture, the statements used should be appropriate. The beginning statements prepare the student mentally to receive the explanation. On the other hand, concluding statements are made after the end of the explanation. Both are important and should be appropriate.

(ii) **Explaining links:** Explaining links in the form of words and phrases are meant for establishing continuity of statements used for explaining a concept, phenomena or principle. Some of these are: hence, therefore, since, because, as a result of, due to.

(iii) **Covering essential points:** The explanation given for understanding a given concept or principle should be as complete as possible. The completeness is determined by the scope of concept or principle as specified in the instructional objectives. It should cover all essential points leading to clear understanding of the desired concept or principle.

(iv) **Fluency in language:** For explaining the teacher should speak fluently. The fluency should be such that a student may listen and understand the ideas of the teacher easily.

(v) **Testing the student:** While explaining, questions should be put across to students for their clarity and understanding.

Precautions for the skill of explaining are as follows:

- The explanation should not include irrelevant statements.
- It should be in simple language which students can easily understand.
- It should be in a proper sequence.
- The teacher should not stammer; his language should be fluent and continuous.
- Use of inappropriate vocabulary, vague words and phrases should be avoided.

(c) Skill of reinforcement

Reinforcement denotes an event that influences the probability of a response to a stimulus being produced under similar conditions. It belongs to the psychology of learning. It is of two types: positive and negative. Use of positive reinforcement contributes towards strengthening the desirable response or behaviour and use of negative reinforcement contributes towards eliminating undesirable responses.

Following are the main components of skill of reinforcement:

(i) **Positive verbal reinforcement:** The teacher uses the accepting statements in order to make the learning of the students permanent such as 'I understand what you mean' and 'you should express yourself'. In this way, the suggestion of students and use of encouraging language is supported.

(ii) **Positive non-verbal reinforcement:** Sometimes, the teacher uses non-verbal cues to encourage students in the class such as smiling, nodding, listening carefully, or writing the correct answer given by a student on the blackboard. All these acts are positive non-verbal reinforcements.

(iii) **Negative verbal reinforcement:** Sometimes, it is necessary to remove some stimuli in order to make the learning permanent. Words like: 'wrong', 'absurd' or 'I do not like your statements' may look like criticism to the student.

(iv) **Negative non-verbal reinforcement:** On some occasions, a teacher uses negative non-verbal reinforcements like angry glares, threat of a slap, etc. Such negative non-verbal reinforcements too should be avoided.

Precautions for the skill of reinforcement are as follows:

- Same words or statements should not be repeated again and again. There should be a variety of words.
- Excessive use of reinforcement should be avoided. It may remove its effectiveness.
- It should be used for all the students and not only for the intelligent ones.
- Appropriate words and statements should be used.
- While using reinforcement for one student, it should be kept in mind that other student should not feel inferior because of the statement made.

(d) Skill of questioning

The process of asking questions during classroom teaching is considered as the most important part of teaching. It makes students more thoughtful and they become able to understand the depth of the subject. Various aspects are studied by asking questions. It makes the student active and alert in the ongoing process of teaching. It also helps a teacher in gaining knowledge about previous awareness and entry behaviour of students, their interest and attitude towards the subject, and the topic in hand. Adequate questioning skills may help a teacher in effectively interacting with his students.

Following are the main components of the skill of questioning:

(i) **Quality of questions:** Questions can serve the required purpose only when they are framed with care by the teacher. So the following points should be kept in mind while asking questions:

- *Relevant:* The questions asked should be relevant to the topic being taught. Irrelevant questions may confuse the students and hinder the process of teaching-learning.
- *Clarity:* The questions should be asked in a simple and clear language.
- *Specificity:* The questions asked should be specific and to the point.
- *Grammatically correct:* The framed questions should be grammatically correct, otherwise the students will not be able to understand them.

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(ii) **Presenting questions in class:** A teacher should try to ask questions in a clear and audible voice, accent, tone and pitch. Moreover, the speed of asking questions should not be too fast or too slow, and enough time should be given to the students for answering.

(iii) **Involvement of all students:** Questions should be addressed to all students in a class, rather than one individual student. This will ensure the participation of all the students in the class in answering questions.

(iv) **Behaviour of the teacher:** The behaviour of the teacher should be natural while asking questions. There should be patience and sweetness in the voice and in the style of asking questions.

(v) **Prompting:** When a student expresses his inability to answer a question, the teacher can give clues to help him recall what he learnt.

In this way, proper art of asking question along with proper behaviour and presentation can help teachers in learning and acquiring the skill of questioning for bringing effectiveness to their classroom teaching. However, acquisition of this skill requires a lot of practice on the part of the teacher through micro teaching.

Precautions during the use the skill of questioning are as follows:

- Questions should not be irrelevant or confusing.
- A teacher should not ask questions to a handful of students.
- The teacher should wait patiently for a student to answer until he accepts that he does not know the answer.
- While asking questions, the teacher should show pleasant behaviour.
- He should not criticize the student, if the given answer is wrong.

(e) Skill of introducing the lesson

This skill is concerned with the art of initiating the lesson. If lesson starts properly and proceeds smartly, then the teacher is successful and effective. The utilization of previous experience and maintenance of continuity in the main parts of introduction are the major points to remember, while using introductory skills in teaching. Following are the main components which are utilized in the skill of introduction:

(i) **Use of previous knowledge:** One cannot teach in vacuum. So before starting a lesson, it is essential to know about the previous knowledge of students. The new learning is thus based on previous knowledge or experience acquired by students.

(ii) **Maintenance of continuity:** Proper introduction requires continuity in ideas presented to students. There should be a logical sequence between main parts of the introduction. One activity by the teacher should lead to the other one in a chain of continuity creating the need to study the lesson.

(iii) **Objectives and aids:** It is also necessary to select various teaching aids, keeping in mind the objectives of the lesson. The student feels bored as a result of monotonous teaching. Disinterest edness develops in the student. A proper selection of audio–visual devices unleashes life in the introduction of the lesson and the student begins to show interest. The teacher can use various means like questioning, lecturing and storytelling. However, selection of the method should be according to the maturity level of students.

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(iv) **Duration of introduction:** The introduction of the lesson should neither be too long nor too short. The duration of introduction should arouse the interest of students.

(v) **Capability of the teacher:** The teacher should have the capability to arouse interest and encourage motivation in students, without which they shall not show interest in the lesson.

(f) Skill of illustration with examples

This skill is mainly concerned with the selection of examples relevant to the concept. Examples contribute significantly in the teaching–learning process and are helpful in sustaining the attention of students.

Components of the skill of illustration with examples are:

- **Use of media for examples:** These examples are conveyed to the students through media. For illustration, basically two types of media are used: non-verbal and verbal. Non-verbal media includes flowers, models, pictures, plant, videos, etc. On the other hand, when a teacher explains everything verbally by making use of words and thoughts, it is called 'verbal medium'. It is used most commonly by teachers in classrooms. The subject matter is made more interesting by giving examples of daily life. The teacher may draw pictures on the blackboard and then can explain the concept the more clearly. Sometimes, a teacher may use the storytelling method for making the teaching–learning process more effective.
- **Inductive-deductive approach:** It is very important to understand the concept first and then use it. While the former can be properly realized through inductive approach, the deductive approach helps in the latter. The task of illustrating with example requires the use of both approaches; hence a teacher should learn to use both inductive and deductive approaches for development of the skill.
- **Proper examples:** Various types of examples are used by teachers in the classrooms, but while using these examples some points should be kept in mind like:
  (i) Examples should be relevant to the concept being explained.
  (ii) Examples used should be simple, based on the student's past experience and according to the maturity level of students.
  (iii) An example should be interesting so that it could retain the attention, interest and curiosity of students for better understanding.
  (iv) Whether a teacher is giving interesting examples or not can be judged through the overt behaviour of students and the overall classroom environment.

Precautions while the using skill of illustration with examples are:

(i) The objectives of the lesson being taught should be kept in mind while using this skill.
(ii) The illustration used should be related to the main concept or idea.
(iii) The examples used should be according to the maturity level of students.

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(iv) Multiple media should be used for explaining the concept.

(v) Examples used by the teacher should be interesting and motivating so that students pay attention.

Advantages of micro teaching

Micro teaching is very helpful for making the process of teaching more effective and successful. Some advantages of micro teaching are:

- It enables teachers to focus on certain areas of teaching and to view them from different perspectives.
- It increases training-effectiveness using a scaled down teaching simulation environment, which reduces the complexities of normal classroom teaching and eliminates the pressure resulting from real classroom settings.
- One major advantage of micro teaching is the provision of immediate feedback to bring improvement in the teacher's behaviour.
- The main objective of the micro teaching session is to provide the participants with an environment for practice-based teaching to instil self-evaluative skills.
- It caters to the need of individual differences in teacher training. Each trainee develops teaching skills at his own pace.
- It employs real teaching situations for developing skills.
- Micro teaching gives instructors an opportunity to be analysed by a small group of audience, and also to observe and comment on other people's performances.
- It is hardly a substitute for teaching practice, but it offers advantages such as close supervision, manageable objectives established according to individual trainee needs and progress, continuous feedback, an unprecedented opportunity for self-evaluation, immediate guidance in the areas of demonstrated deficiency and the opportunity to repeat a lesson whenever desired.
- Through micro teaching, teachers are able to pursue self-initiated, self-directed and self-observed growth.
- It is a very useful method for both pre-service and in-service teacher education.
- Micro teaching offers the advantages of both controlled laboratory environment and realistic practical experience.
- A micro teaching session is a chance to adopt new teaching and learning strategies.
- It is well suited to help teachers identify single concepts, and learn how to create learning modules to build longer lessons.
- Micro teaching can also be used in research work in various situations related to teaching.

Disadvantages of micro teaching

The disadvantages of micro teaching are as follows:

- It is skill-oriented rather than content-oriented. The main emphasis in this technique is on learning the teaching skills and content, which is an important part of teaching-learning process.
- It is performed in artificially controlled conditions.
- The main emphasis of micro teaching is on mastery of one teaching skill at a time, whereas actual teaching is a combination of many skills that operate simultaneously.
- It is a time-consuming technique since one trainee practises a skill in about 35 minutes.
- An effective micro teaching technique requires tape records, video remove tapes and closed circuit cameras. Thus, it is costly for Indian schools.
- For successful implementation, micro teaching requires competent and suitably trained teacher educators.
- Micro teaching alone is not sufficient to attain perfection in teaching. It needs to be supplemented and integrated with other teaching techniques.
- It cannot be a substitute for real classroom lesson.

7.2.2 Simulation Social Skill Training (SSST)

Educational games are a recent addition to the array of instructional techniques made availabe to teachers. Educational games, it is observed, usually stimulate social skills and help students to understand human behaviour. Games focus on human interaction within a social structure. For instance, children may be taught to simulate most of the social etiquette through toys and their manipulation. Role-play games can help students to learn the norms for various types of human interaction in the society. Simulated games are very helpful in removing student-teacher polarization usually associated with traditional teaching in which students are passive listeners.

Educational games serve the following important purposes:

1. Games are valuable during the application category of transfer of training or learning. Through games students can transfer concepts, facts and skills learned in one context to another. It is of interest to note that in ancient India, Rajas and Nawabs used to play the game of chess in their palaces and from this learnt military techniques. In due course, military games have become very sophisticated and several types of war games have been developed to train the military recruits.
2. Educational games can be used to raise questions and to generate hypotheses.
3. Educational games may require students to make value judgements and to act in terms of their values.
4. Educational games make learning interesting.
5. Simulation games are introduced for the purpose of introducing the elements of competition, cooperation and conflict as they normally occur in real life.

Hoover (1980) has mentioned the following steps in applying simulation games to teaching situations:

Step 1. Identifying the problem to be used in simulation.

Step 2. Developing the outline of the simulation game.

Step 3. Identifying the actors or teams of simulation.

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Step 4. Identifying game resources.

Step 5. Playing the simulation games.

Step 6. Conducting post-game discussions.

Role playing: Role playing is often referred to as 'practice in reality'. Role playing provides practice in 'how to behave in selected situations'. Role playing enables learners to understand the attitudes, feelings or situations of those persons whose roles they assume. In role-play games, participants are assumed to play realistic social roles. They interact with one another in terms of a common social situation. Important objectives of designing role-play games are to enable participants to learn to bargain, negotiate, compromise and make decisions.

Problems of using Simulated Social Skill Training (SSST)

Flander has suggested the following problems:

(1) The ability to ask open or closed questions at the appropriate time.

(2) The ability to ask a question which lifts the current level of abstraction or a question which lowers it.

(3) The ability to ask questions from the areas in which concepts and logical connections have been expressed by the students previously.

(4) The ability to summarize what students have said previously.

(5) The ability to ask a question which may move the discussion to the next step in a logical sequence of problem solving.

(6) The ability to make the appropriate use of ideas expressed previously by the students.

(7) The ability to make constructive use of positive and negative feels of the students.

(8) The ability to provide reasons for using 'praise' or 'blame'.

(9) The ability to predict the consequences which follow from alternative actions.

(10) The ability to assist pupils to compare consequences of alternative actions through speculation before arrived at decisions.

(11) The ability to guide constructive discussions.

(12) The ability to clarify the first steps needed to start work in ways that are in accordance with the interests and abilities of the pupils.

(13) The ability to organize pupils' ideas in terms of teaching objectives for reinforcing selectively those ideas which are in target.

(14) The ability to demonstrate and explain the use of logic in classroom discourse.

(15) The ability to assist pupils to maintain consistency in the meaning of words and to assist to distinguish matters of fact, opinion and value.

To sum up, it can be said that simulation can be made a powerful tool in solving some of the problems that hinder effective teaching and it can also impart training of certain skills which are necessary for teaching and its effectiveness. Needless to mention that simulation exercises can be improved by a systematic experimentation around it. SSST (Simulated Social Skill Training) may be given a fair trial.

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Role of the teacher in simulation games

In simulation games, a teacher is expected to play a relatively non-directive role. His role is that of a consultant or a referee or both. He explains the main purpose of introducing the game and its procedure. He plays the role of a referee. After the game is over, he guides the discussion to determine the extent to which students understand the main ideas that structure the game. He may put questions to the students to focus on the key features of the game.

7.3 FLANDER'S INTERACTION ANALYSIS (FIACS)

Several techniques have been devised to observe teacher behaviour and interaction analyse in the classroom. One of the most important technique is the one developed by Ned. A Flander. It was used by Flander in 1959 in the University of Minnesota as a teacher training technique.

In Flander's interaction analysis system, the entire classroom interaction is divided into three main sections: (a) teacher talk (b) student talk and (c) silence or confusion. In this method an observer observes a teacher's verbal behaviour and puts a tally every three seconds against one of the ten categories of teacher behaviour as they may occur. After observation, the total number of tallies in each category are counted and the ratio between teacher talk and student talk is determined. We have better student teacher interaction, if a teacher talk is more often followed by student talk and student talk by teacher talk. Teaching is an interactive process which is mainly influence directed. A teacher tries to influence the students. However, this influence is not only one way. Both the teachers and students influence each other but the influence exerted by the teacher on the students is of greater and far reaching significance. But the question arises, how to describe the teacher's behaviour which is not only complex but variable as well. Flander's 'Interaction analysis is an observation procedure designed to minimize these difficulties, permitting a systematic record of spontaneous act, and scrutinizing the process of instruction by taking into account every small bit of interaction.'

Categories of Interaction Analysis

Teacher Talk

Indirect Influence

1. *Accepts feeling:* Accepts and clarifies the feeling tone, of the students in a non-threatening manner. Feeling may be positive or negative. Predicting or recalling feelings are included.
2. *Praises or encourages:* Praises or encourages students' action or behaviour. Joke that releases tension, not at the expense of another, individual nodding head or saying 'Um him' or 'go on' are included.
3. *Accepts or uses idea of the student:* Clarifying, building or developing ideas suggested by a student. As a teacher brings more of his own ideas into play, it shifts to category five.
4. *Asks questions:* Asking a question about content or procedure with the intent that a student answers the qeustion.

Check Your Progress

1. Fill in the blanks.
   (a) _____ draws heavily from the cognitive powers and scholastic achievements of the person engaged in it.
   (b) Teaching behaviour exists in the context of _____.
2. State whether the following statements are True or False.
   (a) The history of microteaching goes back to the mid-1970s when Dwight Allen and his colleagues from the Stanford University developed a training programme.
   (b) The six steps generally involved in microteaching cycle are: (i) plan, (ii) teach, (iii) feedback, (iv) re-plan, (v) re-teach and (vi) re-feedback.

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Direct Influence

5. *Lecturing:* Giving facts or opinions about content or procedure: expressing his own ideas, asking rhetorical questions.
6. *Giving directions:* Directions, commands or orders to which a student is expected to comply.
7. *Criticizing or justifying authority:* Statement intended to change student behaviour from a non-acceptable to acceptable pattern: bowling someone out, stating what the teacher is doing.

Student Talk

8. *Student talk-response:* Talk by student in response to teacher. Teacher initiates the contact or solicits student statement.
9. *Student talk-initiations:* Talk by students which they initiate. Students start putting questions to teachers in order to seek more clarification on a point or topic.

Silence or confusion

10. During teaching, the teacher sometimes observes silence for a few seconds. A teacher may also pause for sometime. For instance, a teacher may put question to the entire class. Then there is a pause for a few seconds. Both the teacher and the students are silent. During this period, the students get time to think, gain confidence and stand up to give the answer.

Indirect influence of teacher behaviour concepts: This is defined as actions taken by the teacher which encourage and support student participation. We can define indirect behaviour operationally by noting down the percentage of teacher statements falling within categories 1, 2, 3 and 4.

Direct influence: This refers to actions taken by the teacher which restrict student participation. This increases the control of the teacher and stimulates conformity and compliance. In direct influence, the net result is the decreased extent of freedom of action for the students.

Check Your Progress

3. Fill in the blanks.
   (a) In Flander's interaction analysis system, the entire classroom interaction is put into three main sections, namely, _____.
   (b) Teaching is an _____ process which is mainly influence directed.
4. State whether the following statements are True or False.
   (a) One of the most important techniques of interaction analysis has been developed by Flander.
   (b) Direct influence in interaction analysis refers to actions taken by the teacher which does not control student participation.

7.4 SUMMARY

In this unit, you have learnt that:

- Mc Nergency and Carner (1981) regard teacher behaviour as a function of the characteristics of the teacher, his environment and the tasks in which the teacher engages.
- Some of the characteristics of teaching behaviour are: (i) Teaching behaviour is an interactive process (ii) Teaching behaviour is a goal directed activity (iii) Teaching behaviour includes several skills.

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- The history of micro teaching goes back to the mid-1960s, when Dwight Allen and his colleagues from the Stanford University developed a training programme.
- There are several definitions of micro teaching. D.W.Allen (1966) has defined micro teaching as a scaled down teaching encounter in class size and time.
- Micro teaching is an experiment in the field of teacher education, which has been incorporated in the practice of teaching schedule.
- Micro teaching involves the following three phases as suggested by Cliff and others: (i) Knowledge acquisition phase (ii) Skill acquisition phase (iii) Transfer phase of micro teaching.
- The six steps generally involved in micro teaching cycle are: (i) plan, (ii) teach, (iii) feedback, (iv) re-plan, (v) re-teach and (vi) re-feedback.
- Some of the important skills of micro teaching are: (i) Skill of stimulus variation (ii) Skill of introducing the lesson (iii) Skill of explaining (iv) Skill of questioning (v) Skill of reinforcement.
- Micro teaching is very helpful for making the process of teaching more effective and successful.
- Micro teaching enables teachers to focus on certain areas of teaching and to view them from different perspectives.
- One major advantage of micro teaching is the provision of immediate feedback to bring improvement in the teacher's behaviour.
- Educational games, it is observed, usually stimulate social skills and help students to understand human behaviour. Games focus on human interaction within a social structure.
- Role playing enables learners to understand the attitudes, feelings or situations of those persons whose roles they assume. In role-play games, participants are assumed to play realistic social roles.
- It can be said that simulation can be made a powerful tool in solving some of the problems that hinder effective teaching and it can also impart training of certain skills which are necessary for teaching and its effectiveness.
- In simulation games, a teacher is expected to play a relatively non-directive role. His role is that of a consultant or a referee or both. He explains the main purpose of introducing the game and its procedure. He plays the role of a referee.
- In Flander's interaction analysis system, the entire classroom interaction is put into three main sections: (a) Teacher Talk (b) Student Talk and (c) Silence or confusion.

7.5 KEY TERMS

- **Micro teaching:** Is defined as a particular technique of teacher education, in which a teacher applies clearly defined teaching skills in carefully planned lessons within a stipulated period.
- **Social Skills Training (SST):** Is a form of behaviour therapy used by teachers and trainers to help persons who have difficulties relating to other people.

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7.6 ANSWERS TO 'CHECK YOUR PROGRESS'

1. (a) Teaching behaviour (b) social interaction
2. (a) False (b) True
3. (a) (i) Teacher Talk (ii) Student Talk and (iii) Silence or confusion (b) interactive
4. (a) True (b) False

7.7 QUESTIONS & EXERCISES

Short-Answer Questions

1. Differentiate between teacher behaviour and teaching behaviour.
2. What is micro teaching?
3. List some of the characteristics of micro teaching.
4. Differentiate between micro teaching and traditional teaching.
5. Write a short note on Flander's interaction analysis (FIACS).

Long-Answer Questions

1. Explain the chief characteristics of teaching behaviour.
2. Describe the micro teaching cycle.
3. Elaborate the Indian model of micro teaching.
4. Explain briefly the important skills of micro teaching.
5. What are the advantages and disadvantages of micro teaching?

7.8 FURTHER READING

Dwight, A. & Ryam, K.; *Micro Teaching*, Addison Weslly Publishing Co., London, 1969.

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UNIT 8 MODERN APPROACHES OF TEACHING

Structure

8.0 Introduction
8.1 Unit Objectives
8.2 Use of Modern Technology in Teaching
8.3 Computer-assisted Instructions (CAI)
  8.3.1 Personalized System of Instruction (PSI)
  8.3.2 Security Awareness Instructor (SAI)
  8.3.3 Modular Teaching Approach
8.4 Summary
8.5 Key Terms
8.6 Answers to 'Check Your Progress'
8.7 Questions and Exercises
8.8 Further Reading

8.0 INTRODUCTION

In the global arena, teaching is no longer restricted to classrooms. Nowadays, several advanced technologies are facilitating in imparting education. The advent of computers and other technologically advanced equipments have made it possible for students to get better education while being situated in distant locations. Distance education is now becoming a reality for students where students are learning at their own pace through the medium of study guides, learning material and audio-video mediums.

In this unit, you will learn about the use of advance technologies in teaching, computer-assisted instruction (CAI), personalized system of instruction (PSI), SAI, IGSI and modular approach.

8.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Interpret the use of modern technology in teaching
- Analyse the usage of Computer-Assisted Instructions (CAI)
- Identify the Personalized System of Instruction (PSI)
- Describe SAI and IGSI
- Assess the modular approach

8.2 USE OF MODERN TECHNOLOGY IN TEACHING

Vikram Sarabhai, the father of Indian Space Programme, highlighted the significance of technology as, 'We are to play a meaningful role nationally, and in the community of nations; we must be second to none in the application of advanced technologies to

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real problems of man and society.' In this context the use of technology in education assumes special importance.

Highlighting the importance of information and communication technologies, UNESCO (1996) observed:

> *'... as tools for the education of children and adolescents, the new technologies offer an unprecedented opportunity to satisfy increasingly widespread and diversified demand, while maintaining quality. The possibilities they open up, along with their advantages for teaching, are vast. Computers and multimedia systems, for instance, make it possible to design individual learning paths along which each pupil can move at his or her own pace; they also make it easier for teachers to organise acquisition in mixed-ability classes.'*

The role played by Information Communication Technology (ICT) in the paradigm shift of models of education is important here.

Three Models of Education

Model	*Focus*	*Student Role*	*Technology*
Traditional	Teacher	Passive	Blackboard/TV/Radio
Information	Student	Active	Personal Computer
Knowledge	Group	Adaptive	PC + Network

***Table 8.1** Key Factors in the Paradigm Shift*

Factor	*Development*
Time	The time factor will no longer be a constraint. Asynchronous education frees the student from the demands of time.
Space	The distance factor will no longer be a constraint. The student can take part in education without being physically present at the teaching institution.
Cost	The pedagogical investment for modern distance education is certainly greater than that of the traditional model, whether in terms of initial outlay or the investment related to the delivery of education. There are two factors, however, which will reduce the overall cost in factors of scale: 1. The reduction of needs in terms of area and premises; and 2. The appreciable increase in the size of the virtual class.
Relationships	The traditionally vertical teacher-student relationship will evolve towards a more **horizontal** model, in which the teacher becomes a facilitator, on expert or colleague and the learner becomes active. In this evolution of roles the group will gain importance as a source for consultation, dialogue and collaboration. Through this mechanism the education is 'received' by the individual in interaction with a group, of which the teacher constitutes only one element. Roles are thus completely redefined, and the dynamism of the new roles requires a new student.
Information/knowledge	The transfer of knowledge is no longer the primary object of education. The student must learn to gather information as the need arises, to evaluate it, and to transform it into knowledge through the relational process.
Market	By easing the constraints of space and time, education will open up to the **global market,** where language will become one of the main constraints on expansion.
Competition/collaboration	The internationalization of the education market and the emergence of new entities placed deliberately in the commercial area will intensify competition between educational establishments. Simultaneously, collaboration and **strategic alliances** on the part of universities will become imperative as the appropriate response to change.
Assessment	The traditional concepts of student assessment based on (examination) results will have to be adapted to new methods in which the assessment of the process will gain more importance so that the measuring of assimilated knowledge can be circumvented and factors more sensitive to the equation of the new **professional** can be integrated: ability to carry out research, to adapt, to communicate, to collaborate, etc.
Type	The distinctions drawn between the various types of education (primary, secondary, technical, university, vocational) will becomes less important, and the emphasis will be placed on **continuing** education.

(Didier Oilo, *From Traditional to Virtual: The New Information Technologies-Thematic Debate,* UNESCO, 1998.)

Major technologies in education

Following are the important technologies in education that have combined to make the communication revolution and information age a challenging era for educators:-

1. Computer
2. Artificial Intelligence (AI)
3. Computer Assisted Instruction
4. CD-ROM (Compact Disc-Read Only Memory)
5. Dial Access
6. Educational Television (discussed in Chapter 17)
7. EDUSAT (Educational Satellite)
8. E-mail (Electronic Mail)
9. Teleconferencing
10. Telelecture
11. Teletutorial
12. Teleseminar
13. Video
14. Interactive Video
15. Videotex
16. Videoconferencing
17. Digital Resources

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18. Virtual University
19. Internet

Artificial intelligence (AI)

AI is a branch of computer science that deals with the task of making intelligent machines that can perform better than humans. Today, the best computerized learning programmes already include certain forms of artificial intelligence that can diagnose the student's learning deficiencies and tailor instruction to them. AI is a computational technology that involves the symbolic representation and processing of knowledge.

CD-ROM (compact disc-read only memory)

ROM is a semi-conductor memory device which is used to store information of a permanent nature. It is non-volatile memory which retains the stored data even when the power to the device is shut off. It has become an important part of several digital systems on account of its low cost, high speed, system design flexibility and data non-volatility. The read-only memory has a variety of applications in digital systems such as implementation of combinational logic and sequential logic, character generation, look-up table, microprocessor programme storage, etc.

Dial access

Dial access is a round-the-clock delivery system through which callers can get access to a vast library of audio cassettes. It belongs to audio technology which uses the educational network (ETN).

The important merits of this system are:-

1. Students can dial up lessons from the library.
2. Instructors can call for audio-visual material from a distribution centre.
3. Paying for a number of instructors to teach repeated sections of basic courses can be associated.
4. Instead of trying to find room for classes to meet on campus, universities could enable students to watch videotapes of the lecture individually.

However, the use of dial access technology has become less popular with the advent of the easy-to-use audio and video tape players.

E-mail (electronic mail)

It is natural to communicate with our friends and business associates based in distant locations, and this is the essence of networking. Human beings have always corresponded with each other in as rapid a fashion as possible for the era they lived in, when they could not meet personally, face to face. In today's electronics or information technology age, electronic mail (E-mail or email) allows us to communicate quickly and easily with friends and colleagues situated at distant places, and around the world. The use of e-mail is not only rapidly increasing but changing the way in which teaching, learning, research, healthcare, business, and administration are conducted. E-mail is the most widely used application. The speed with which it reaches its destination, and

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its low cost allows people to keep in touch with the day-to-day happenings in their businesses, professions and the happenings around the world. As e-mail becomes a common part of our day-to-day routine, we should understand its functioning in a proper manner.

Internet addressing convention

Basically an internet e-mail address is made up of three parts. The first part identifies the username of the person to whom you wish to send mail. The second part identifies what host computer (or server) the person receives the mail on. Finally, the third part identifies what subdomain this host computer is located on. All three parts constitute a complete Internet e-mail address. Take a look at the example:

surekha@giasbm01.vsnl.net.in

The username here is 'surekha'. The host computer is 'giasbmol'. The 'vsnl.net.in' is the subdomain of the national domain 'in'. The subdomain name 'net' identifies VSNL as a network service provider. If we are sending mail to someone on the same host computer, i.e., giasbmOl, we need not supply any other information beyond the username, for example:

vipul

If we are using PINE (Program for Internet News & E-mail) on giasbmol, this message will get delivered to Vipul, who has an account on the host 'giasbmol'. If we want to write to someone in Delhi who has an account on giaslol, we may address the mail as follows:

ram@giasl01

This will deliver the mail to Ram who has an account with VSNL's GIAS service in Delhi. We do not need to mention his full Internet address, which is 'ram@giasl01.vsnl.net.in. This is because the domain 'vsnl.net.in' is common to all the servers or host computers under VSNL in India. For all other addresses we need the full address as we discussed in the very first example.

Teleconferencing or interactive television

Teleconferencing or interactive television is a two-way electronic communication between two or more groups or three or more individuals who are at separate locations.

Interactive television combines traditional TV viewing with interactivity of the Internet and personal computer.

In education, teleconferencing is used for the following purposes:

- It provides expert instructors to remote schools, colleges, uni-versities and offices.
- It offers quality instruction to learners scattered over several sites or over a large area.
- It allows learners to interact with the expert and with each other at multiple locations.
- It provides in-service training without leaving the work place.

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Equipments needed in teleconferencing

1. Satellite transponder.
2. Stubs.
3. A studio uplinked with the earth stations that can uplink the programme to the satellite and reception centres with direct reception facilities which can download the programmes uplinked from the studio of the stub.
4. Telephone.
5. STD.
6. Computer network.

Types of teleconferencing

The three types of teleconferencing are:

1. Audioconferencing
2. Videoconferencing
3. Audiographic teleconferencing

Teleconferencing, a substitute for face to face meetings, is a new form of video-based communication via telephone lines or satellite broadcast. A teleconference is set up by making a network available for a group of participants to act freely in a discussion mode. It is one of the most important examples of how telecommunication is being adopted for the learning system.

In teleconferencing, people situated at distant locations can conduct a meeting by typing messages at their terminals.

The conference may be a videoconference or a computer-based conference or an audiographic one. The most important characteristic is that the participants may interact in a relatively unprepared or unstructured mode on the topic set up for discussion.

In teleconferencing, a participant may leave at will and catch up on what he has missed during his absence when he comes back. Summaries are instantly available. It is not even necessary for all the participants to be present at the same time and attendance may by anonymous.

The area of applicability of teleconferencing is limited to certain categories of educational goals, for instance to tasks which require comparisons of viewpoints, group discussion, voting on an issue and so on.

Classification of teleconferencing according to the media used

Audioconferencing: This is conducted by means of several telephones in different localities, often amplified for group listening, linked together into a network that allows all the stations to both transmit and receive spoken messages.

Videoconferencing: It is the system which may allow full audiovisual message transmission between all the linked stations, or may be limited to one-way video transmission from the first station supported by multi-way audio transmission between all the satellite stations.

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Audiographic conferencing: It is a system that supports a basic audioconferencing system by some means of transmission and sharing of visual material—these may use any combinations of previously mailed printed material, fax transmission, networked personal computers or special purpose slow-scan television camera systems that capture and transmit still images from one station to another across the normal telephone system.

Computer-conferencing: This is a system that utilizes existing network of computers as a means of collaborative decision-making and discussion on the basis of shared (usually text-based) messages and files.

Benefits of teleconferencing

Meetings

1. Teleconferencing enables the possibility of holding meeting that could not otherwise have taken place due to financial, time or other such constraints.
2. It reduces travel time and expense.
3. It provides the means to conduct meeting on a more regular basis, or at a moment's notice, thus accelerating decision-making and reducing time to arrive at conclusions.

Distancs learning

1. Teleconferencing connects educational facilities worldwide him parting distance learning and employee training.
2. It enables visual participation of remote students.

Telelecture

Telelecture is primarily a one-way information transmission taken by its teacher with a very limited opportunity of questions or comments.

The preparation of telelecture has much in common with the preparation of a face-to-face lecture except that the structure of the message and its packaging in different forms of media and materials must take into account the constraints of the particular system that is going to be used.

A telelecture is usually followed by pre-telecast preparation and follow-up.

Teletutorial

It is a more focussed instructional session involving demonstration and explanation by a tutor, practice by the participants and evaluation and corrective feedback by the teacher.

A teletutorial may be initiated by an individual student or a small group, experiencing a particular learning difficulty by contacting the tutor at a distance with a request for help.

The mode of teletutor is very popular in Australia and New Zealand as well as in some of the remote areas of North America where transport has always been difficult.

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Teleseminar

Teleseminar is characterized by an intensive involvement of participant owing to the small number of the group. It leads to a very focussed, in-depth discussion on a topic where previous experience is shared.

Video

Video is an important medium of learning which is being used on a large scale in modern times. Video technology allows playback of programmes.

A videotape recorder (VTR) has the following advantages:

(i) Tape can be played back as soon it is made.

(ii) Tape can be erased and re-used several times.

(iii) It is easily distributed and used.

(iv) Videotape recordings of teachers can indicate to them ways to improve their teaching-learning methods.

(v) Specific programmes such as teaching skills, demonstrating and illustrating ideas are developed and used at all levels of education.

(vi) Instructional and professional resources from well-known experts could be brought directly to the learners.

The VTR records images as well as sounds. It consists of (i) a camera, (ii) a microphone, (iii) a tape recorder, and (iv) a cassette or a specially recorded tape. Images and sounds are recorded as electronic signals on the tape. Thereafter signals are converted to pictures and sounds during playback.

Interactive video

This technology combines the attributes of sound, motion, colour, audio and tailored information via branching presentations.

Interactive video permits a viewer to participate in a simulated conversation on the TV screen.

On account of its heavy costs and complexity the service of this medium has not expanded in the field of education as anticipated earlier.

Videotex

Videotex involves the transmission of display text and graphics and their reception on a television set. Videotex is of two types: (i) Broadcast Videotex (Telecast), and (ii) Interactive Videotex (View Data). Both are used for educational purposes.

In telecast type, the user can select information only from the limited amount being transmitted.

In view data type, a user can get access to thousands of pages of information stored in several computers.

Videotex is very useful in distance education in disseminating information regarding courses and programmes available.

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Videoconferencing

Video-teleconference is a teleconference that includes video communications.

Video-teleconferencing system transmits voice, graphics and images of people. It has the advantage of being able to show the image of the speaker, three-dimensional objects, movements, and pre-produced video footage. On account of its ability to show the images of participants, video-teleconference can create a 'social presence' that closely approximates face-to-face interaction. This is a fully interactive system that either allows for a two-way video and audio, where the presenters and the audience can see and hear each other, or one-way video and two-way audio, where the audience sees and hears the presenter, and the presenter only hears the audience.

Videoconferencing in education

With the use of technology in the classroom, both teachers and students reap several benefits. Increased academic achievement, efficiency in the operation of schools, and the number of technically qualified students entering the workforce as well as the improved literacy in terms of technology, innovative teaching practices, and community relationships are some of the rewards of videoconferencing.

Videoconferencing, that allows individuals or groups at different locations to meet face-to-face in a real time setting, has found its niche in a world of new and emerging technologies. In the past, distance learning with two-way video and audio was way beyond the reach of many professional and academic organizations. Innovative telecommunication technologies such as ISDN (Integrated Services Digital Network), and IP (Internet Protocol) compressed videoconferencing systems have lowered costs, making videoconferencing feasible for many colleges, businesses and libraries, etc.

Several educators view videoconferencing as an extension of the classroom. Videoconferencing provides an effective teaching medium because it is geared toward the first truly digital generation.

Videoconferencing is advantageous because it enhances the learning process, increases student motivation and participation and encourages cultural diversity. It provides access to a vast array of information and resources to satisfy student's individual needs. Student's comprehension of difficult or abstract concepts is easily developed through the face-to-face interaction of videoconferencing. Positive relationships among different groups—educators, student, and community members—are cultivated through videoconferencing. Videoconferencing establishes a visual connection between experts (presenters) and participants (educators, students, and parents).

It allows the educators to meet and match the educational needs and abilities of their students. The technology supports the shift away from traditional lessons that are short, isolated, and educator-centred to a student-focussed interactive experience.

Digital Resources

We are living in a digital world. Digital technology is used in a big way for producing, preserving and distributing information. Computers now outnumber office workers in several parts of the world. We do online or tele-banking and enjoy digitally mastered music.

In recent years academic and other institutions have started creating and distributing information in a plethora of digital formats at relatively low costs and without the need for complex programming skills that were once needed.

Digital sound recording and digital photography are also being widely used.

Virtual university

Recently virtual university has come into existence. People are studying in virtual classrooms. One need not travel to other countries for educational purposes. One can pursue education staying at one's own place of residence. With the growing population, traditional colleges and universities are not in a position to give admission to all those who possess the required qualifications for eligibility and desire to pursue higher education. To cope with the problem, distance education institutions and open universities were established. However, these facilities also were considered insufficient. A large number of foreign universities have started opening their doors to students from other countries. Such universities make use of the Internet and thus have eliminated all limitations of traditional (real) universities. Such a university is called virtual university. It admits students belonging to any country.

The chief requirement of a virtual university is the availability of Internet facility with the prospective student. Students enrolling with the virtual university can take admission in any programme provided he possesses all the essential pre-requisites of the programme. When one has taken admission, he need not travel and can learn any topic anywhere at any time. Formalities like filling a form, taking entrance examination, getting enrolled or registered payment of fees, etc., can be done online through the Internet from one's own place.

A virtual university provides a number of courses and programmes. A candidate can select any course. Once the selection of the course is done, a student can start learning any course through any method of teaching-learn-ing, viz., lecture method, discussion method, seminar method, self-learning method, etc.

A virtual university can have the potential to offer various courses and programmes ranging from undergraduate to Ph.D., D.Sc, D.Litt., etc.

A student can also download any portion of instructional material for future use. He can continue reading the same topic for any length of time and through as many methods as he wishes. Teaching-learning in a virtual university is individualized. A virtual university, by providing the element of flexibility, can nurture the talent of an individual. A student enrolled in a virtual university can take examination at any time he likes. A brilliant student can complete a programme of three years' duration in two years or even in lesser period. There may not be any age criterion.

The only criteria for admission and completion of a course will be the competencies and potentialities of the candidate himself. A virtual university presents the possibility of globalization of education.

Internet

Internet is the abbreviation of inter-network systems and is described as a network of the computer system. In a general sense, the Internet is defined as 'a global pool of information and services, accessible by means of locally executed interface software'.

When two or more computers or other devices are connected together in such a way that they communicate by sending message to each other, they form a network. It is the largest network over which two computers located in different parts of the world communicate. The estimated number of Internet users worldwide in the year 2000 exceeded 30 crores. This number is growing by about 50 per cent every year.

The Internet which began in 1968 in the United States Department of Defence Research is a new communication technology that is affecting our lives at a scale as significant as the telephone and the television.

A brief history

Internet is the outcome of military needs and the product of a military undertaking. USA is the birthplace of the Internet. It was created as ARPANET in 1969 by the Pentagon's Advanced Research Projects Agency (ARPA) in 1969. (Pentagon is the military agency headquarters of the USA at Washington.) The initial was simple—to develop a geographically dispersed, reliable communication network for military use that would not be disrupted in case of partial destruction from a nuclear attack. That aim was accomplished by splitting the data being transmitted into small packets, which could take different routes to their destination. The 'packet switched' network can resist a nuclear attack in that the packets can take a different route if one route is knocked off. This main feature of Internet technology also makes it almost impossible to sneak into the confidential messages.

The procedure developed for interconnecting ARPANET computers and communicating the data was called TCP/IP, an acronym for Transmission Control Protocol/Internet Protocol. ARPANET allowed engi-neers and scientists working on military contracts all over America to share computers and computer resources. As a second thought, the computer scientists developed a way to exchange messages. This feature, 'e-mail' turned the network into a new communication link. The ARPANET was initially confined to organizations and individuals having US government security clearance and working on government contracts. But it soon merged with a non-government, parallel academic network called Usenet News, launched in 1979, which grew and eventually came to be known as the Internet.

Usefulness of the Internet

Here are some of the ways in which the Internet can be useful:

- Exchange e-mails with millions of people through e-mail addresses.
- Search retrieve, and read millions of files stored on computers throughout the world.
- Search and bring to your computer shareware, freeware and commercial software.
- Search databases of governments, individuals and organizations for files on thousands of topics.
- Join specific topic-oriented discussion groups (known as newsgroups).
- Send and receive programme data files such as desktop publishing files, spreadsheet, CAD files or word processor files, which you or the receiver can

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immediately start to work on. Send and receive sound, animation and picture files from far-off places.

- Set up temporary or permanent discussion or work-oriented groups.
- Browse through resources of private or public information services that are on the Internet.
- Communicate in real time with others connected to the Internet. Set up a site with information about your company's products and services.
- Browse and search 'catalogs' of goods and services, and purchase items online. Conduct test marketing. Distribute electronic publications. Read electronic publications. Sell products and services.

Education through the Internet

1. Internet is highly educative as it provides access to information and contains enormous of data on numerous topics.
2. Internet has information on most of the advanced research topics in highly technical or scientific areas besides information on other petty topics as well.
3. The use of the Internet could provide wider access to good quality education at a low cost.
4. It provides information and education to the wider population located in every nook and corner of the globe.
5. It may be considered as a tool to disseminate large quantities of information to propel the masses forward on a path of prosperity in the shortest possible time with minimum resources.
6. Internet technology can be very helpful in tackling adversities of nature like earthquakes, landslides, etc., and disparities of caste or creed of the society.
7. The learning process on Internet is interesting and interactive.
8. The students have a great opportunity to be creative.

The Internet would also remove the limitations of:

- classroom size
- fixed period of imparting education
- restrictions on the learner's pace of learning
- the learner's ability to afford quality education in the best school, college or university anywhere in the world.

The Internet can support the following types of education:

- schooling
- continuing education
- re-skilling or re-education
- task-specific immediate education.

There is no doubt that the Internet offers the unique opportunity of providing education at a fast pace.

The Internet has varied educational uses. Even a well-established traditional library can hardly match the resources available on the Internet. This is not to say that the Internet can replace the library. But the simple fact is that no library on earth has the financial resources to buy the latest international books on everything under the sun. This is where the Internet comes handy for students, teachers, research-ers as well as for those preparing for several competitive examinations including the Civil Service Examination.

It frees one from the hassles of collecting reports from different sources for projects and research reports—wasting valuable hours travelling to various libraries all over the country to check their availability. The Internet makes all information available at the click of a mouse button.

Name any branch of study—the Internet provides the requisite information—whether it is to keep informed of the latest scientific discoveries or to enhance one's skills. The Internet helps in enriching classroom discussions.

Universities, research laboratories and the internet

In the late 1980s, the American government, through its agency the National Science Foundation (NSF), set up five super-computer centres, which became the main nodes of the Internet, to which the university and research lab networks became connected.

The number of computers connected to the Internet has been growing exponentially. In 1983 there were less than 500 'host' computers in mostly mostly government laboratories and academic computer science departments. The rest of the academic community got a whiff of its information exchanging ability, and by 1987 there were about 30,000 host computers at different universities and research labs. By 1995 this number had increased to 5 million hosts. Since then expansion has been phenomenal.

Documents and software libraries

In the early 1980s, using the Internet was still difficult. However, its power was obvious. There was no other method to connect universities and research labs around the world which was so fast, convenient and flexible. So, the Internet users at universities came up with a software to participate in discussions over the network. They created documents and software libraries on the network, which were accessible to all users. During this period, the Internet remained within the narrow confines of the academic and research lab world.

Telenet service and BBS

With the prices of PCs coming down, more and more individuals also had computers. This led to an increasing demand by these people to connect their machines with other systems. In response to those demands, online services like Telenet came into existence. For a fee, individuals could connect with them and communicate with other users on the same service, as well as use their repository of information and software, which people could download. Further, along with online service came the concept of the Bulletin Boards Services (BBS), which allows users to connect with another computer in their vicinity and exchange information, share software, etc.

Initially these private networks, both corporate as well as commercial, had different hardware and software platforms and could not connect with each other, but in a brief span of time TCP/IP came to be used by them. Interconnection of these

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networks, BBS communities, and individual PCs in homes and offices by adoption of the Internet technology, TCP/IP, gave birth to the Internet as we know it today. All that is required to connect any network or computer with the Internet, is the capability to use TCP/IP for exchanging information. This is how the Internet became the leading network.

Self-sustaining Internet

During its evolution, the Internet was supported and controlled to a greater or lesser degree by American government agencies, first ARPA, and then the NSF, but now it has become a diversified, in some sense an uncontrollable global entity. Its nodes are supported by diverse sources. In the 1980s ARPA was recognized, its funding was cut and the American defense networks were mostly detached from the Internet. Its funding continued through the NSF, and until recently the NSF paid for connecting the computers of academic institutions and government agencies everywhere in the USA to the Internet. Slowly, the NSF permitted commercial networks to be connected to the Internet, initially for educational and research purposes, while forbidding primarily commercial use. This let to the rapid growth of the Internet.

Internet and commerce

Gradually, commercial use increased as the restrictions were eased. In 1995, companies overcame universities as the main users. In April, 1995 NSF moved out of the scene, and today the American government has no part in running and maintaining the Internet. It is now self-sustaining.

From the laboratory to the mainstream of life

Two other important developments underlie the present explosive growth of the Internet. The first important place at CERN, the European Organization for Nuclear Research. Here physicists developed a software for publishing, searching, and accessing information on the Internet, as a way for scientists to share documents with their colleagues at large. This came to be known as the World Wide Web (WWW).

The second occurred at the University of Illinois, where a young student named Marc Andreessen developed a graphical browser called Mosaic, to access information from the WWW. These two developments have catapulted the use of the Internet from the laboratory into 'o the mainstream of life.

Facilities offered by the Internet

- Transfer of files among computers and using file transfer protocol.
- Access to another remotely located computer through one's own computer.
- E-mail—every Internet user has an e-mail address which helps to transfer mains electonically.
- Network news, where new items are gathered into groups of related items depending upon the topic.
- Internet Relay Chat or just 'Chat' that allows users on the same or remote host to communicate directly from one terminal to another. Hence, the communication is instantaneous and character typed on one terminal appears on the second terminal.

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Working of the Internet

Internet is not run by any single authority. All the computers and wires that make up the thousands of smaller networks connected through the 'Internet' work because they are broken up into small pockets and that the first part of each pocket contains the address where the pocket is meant to reach. How should it work, is not laid down in a master plan nor is there any central computer or authority for this purpose. Instead of having the e-mail route through a central computer and then to its destination, the mail has many ways to travel from one point to another through the Internet over the well-connected web of computers. For transmission hardware, the Internet is dependent on the existing infrastructure developed by telephone companies, tele-communication companies and the national infrastructure resources available for tele-communication purposes.

Internet service providers lease data circuits from the telephone networks and have dedicated computers connected at the end points or modes. These rely on the distributed intelligence of networking equipment known as 'routers', thus bypassing the telephone company's expensive switching computers, while using their transmission lines.

All the content is held by computers known as 'servers', which are owned by organizations and companies, e.g., NIC, VSNL, Satyam, MTNL, and Microsoft, that are in the business of distribution of information.

When request is made to these servers for information, they bundle the requested information in small packets, with address as to where it is to be sent and subsequently send them down to the nearest node to the Internet.

When they arrive at the Internet the packets are read by the router, which is nothing than a traffic cop which sends down in the same general direction as its address. A similar thing happens at the next junction on the Internet. This goes on till the packet is delivered to the right address where it is put together again with other packets to make up the complete original information.

In order to accomplish this task of sending messages across a network, computers use a network protocol. To understand the computer protocol, we can take the analogy of diplomacy rules, i.e., the set of rules of relations and interactions between the representatives of different protocol. In the same way, computers wanting to sendmessages to each other, have to conform to a standard set of rules defined in the networking protocols. This enables different types of computers run-ning different types of operating systems to communicate efficiently. The actual standard today is TCP/IP (Transmission Control Protocol/Internet Protocol). All this is accomplished by dedicated but fast computers that work as routers.

Every organization has its own network and every individual user has his own system and set-up; it does not matter as long as they communicate at the same protocol to the external world.

Getting connected to the Internet

Basically there are four steps of getting connected to the Internet.

(i) The first step is to get an account with the Internet Service Provider, say Satyam, VSNL, or MTNL.

(ii) The second step is to get a modem for your computer to connect with the telephone lines.

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(iii) The third step is to ensure that the computer hardware is adequate for the type of account chosen.

(iv) The fourth step is to verify that we already have suitable communication software installed on our computer.

Once the communication software is installed we need to dial through the hunting telephone numbers provided to us by our service provider to log on to our domain-name computer. This is done by the dialler software. Once we are hooked to the domain-name computer, we need to run our 'Internet Explorer Software', which in turn invokes the e-mail service programme on our PC. The moment the e-mail service starts working, we can compose our e-mail on the screen of our e-mail account. After composing our message we can send it through the send command, which is automatically refelected in the mail outbox. That ultimately passes down to our domain server online. From the domain server, the mail traverses as per the address contained in the e-mail given by us. The mail travels from domain to domain selecting an optimal traversal route determined by the protocol, depending upon the given e-mail address. Finally our email reaches its destination travelling from node to node on the Internet.

On the receiving end, as soon as the receiver logs on to his Internet server, he gets the mail delivered on his PC from the domain 'server' immediately. This way our mail reaches instantly, because all service providers keep the domain server and router servers running round the clock.

Abilities and skills needed for the Internet

The learner must acquire the following abilities and skills to collect and present the information gathered from the Internet, and to systematize subsequent deductions and inferences from the collected material:

- Basic knowledge of computer.
- Familiarity with multimedia software.
- Familiarity with Internet software.
- Storing and retrieving information from the Internet and multimedia.
- Communication with the resource person.

Check Your Progress

1. Name the equipments needed in teleconferencing.
2. List the benefits of teleconferencing.
3. What are the merits of a videotape recorder?
4. State some of the facilities offered by the Internet.
5. List the abilities and skills that are needed for the Internet.

8.3 COMPUTER-ASSISTED INSTRUCTIONS (CAI)

Computers may aid the learning process in the following ways:

1. By providing information and instructions
2. By asking questions
3. By being tirelessly repetitive
4. By stimulating processes
5. By selecting the right speed for providing information for individual learners
6. By providing opportunities to try different things

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7. By displaying data dynamically
8. By taking away tedious calculations
9. By doing difficult calculations
10. By providing information from a large store
11. By checking how well a learner understands a topic through questions

Specific uses of computer in education

I. *Four focal areas of computer management support to teachers.* Four areas are as under:

(1) Constructing, scoring and analysing tests.

(2) Keeping a record of the student's performance and progress through the various courses.

(3) Providing guidance to the students and advising them on the selection of next course module.

(4) Reporting on the performance and progress of students to individual students, tutors and educational administrators of the institutions.

The basic objective of CML is to relieve the teacher from these tedious time-consuming tasks so that he can more profitably utilise his time and energy for instructional work. Here the teacher, the students and the computer work in close coordination. The teacher prepares course materials, teaches and helps the students in their learning, the student learns through course materials selected to suit one's individual needs and the computer processes information quickly and accurately and maintains records. A general model of computer managed learning showing the role of the student, the computer and the teacher is shown in figure 8.1.

II. *Computers' educational aims:*

(1) A computer motivates students to achieve aims in an optimal manner.

(2) A computer provides meaningful experiences to students to achieve aims.

(3) A computer assists goal attainment by stressing on sequential learning.

(4) A computer assists in the formation of realistic goals.

(5) A computer assists in the realization of goals by stimulating feeling of success.

(6) A computer assists in the achievement of goals by providing appropriate material for students of diverse capacity and achievement levels.

III. *Use of computer in drill for reinforcement of learning.* Computer-assisted instruction (CAI) has a variety of software to facilitate teaching-learning situations. Drill may be stressed. Students need practice to review what has been learned, otherwise retention may not last long. Repetition for the sake of repetition is not recommended. Software emphasising drill material should be selected very carefully. Only relevant material should be chosen for drill purposes for the use of the learners.

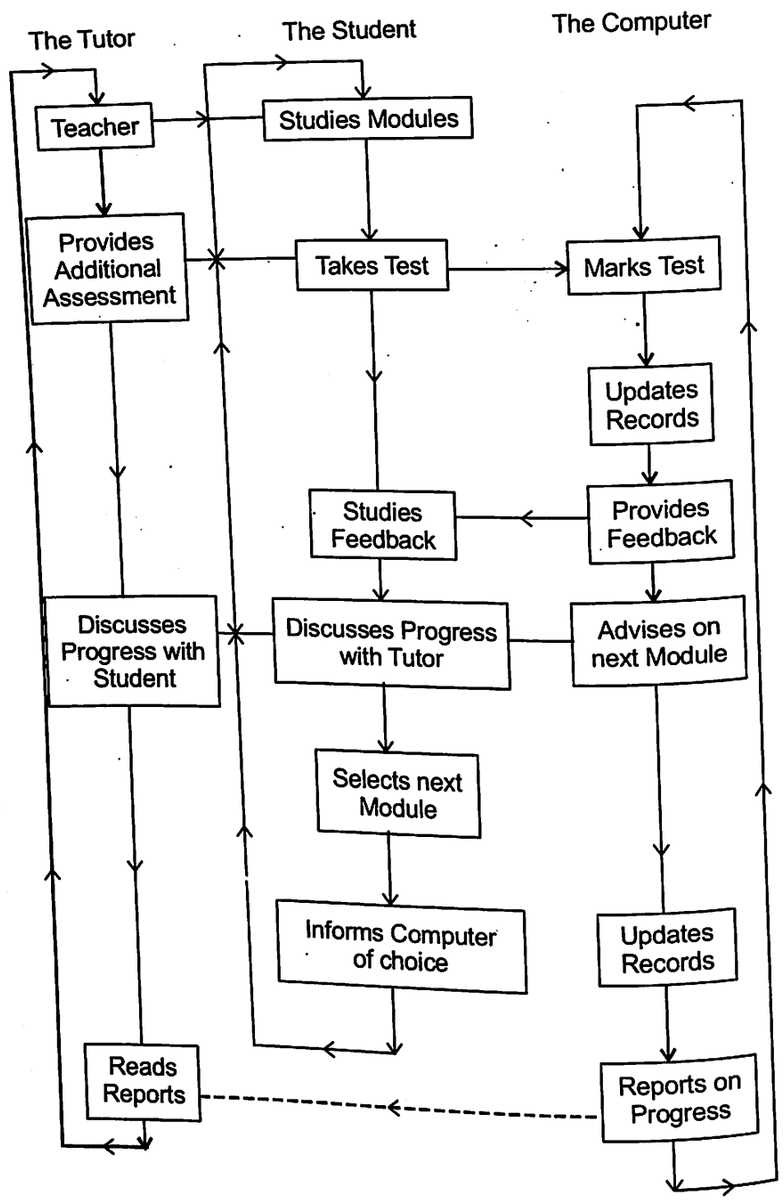


***Fig. 8.1** A general model of computer managed learning.*

A computer does not keltined of presenting drill experiences to learners. Also, a computer does not become frustrated and rude. For correct responses provided by students to programmed items, a smiling face appearing on the screen of the computer can indeed be a personalize learning.

IV. *Use of CAI in new learning.* The fourth factor in emphasizing CAI might well be new learning to be acquired by students. Each student using a computer terminal may experience a programmed instruction. With programmed learning, a learner may read a few statements or see a demonstration on the screen of the computer. A student in return responds to a multiple-choice or a completed item based on what was comprehended from the sentences read or demonstration experienced. After responding, the computer screen may show a smiling face if the response given was correct. If incorrect, the

involved student may try again to respond correctly. If a second wrong response was given, the correct answer is provided on the screen. The successful learner in each response given is ready to progress to the next linear item. The student responding incorrectly also is ready for the next sequential item, after seeing the correct response on the screen. Read, respond and check are concepts emphasized again and again in sequential programmed items. New learnings, not drill and practice, are being emphasized.

V. *Computer learning based on individual needs.* Each student can achieve one's own unique optimal level of achievement. No student needs to wait to have other learners progress at a similar level of achievement. Learners individually may progress as rapidly as personal capabilities permit using computer terminals.

VI. *Computer learning and problem solving.* CAI may also provide problem solving experiences for students. Thus, a problem is presented on the screen of the micro computer. The student using keys on the micro computer types a related decision. Feedback on the screen is provided to the learner relating to the typed decision. A new problem is then presented directly related to feedback to the involved learner regarding the previously made decision. Again, the student types a choice to be made involving, perhaps, four alternatives in a multiple choice item. Feedback is again provided to the student on the quality of decision made, as well as new sequential problem presented on the screen.

VII. *Microcomputers in the reading curriculum.* Marlow Edger thinks that there are numerous means of utilizing personal computers in teaching students in the area of reading. Tutorial programmes provide pupils with new learning. Thus, a programme might emphasize each of the following uses in terms of developing word attack skills:

1. Phonics in assisting learners to associate sound with symbols.
2. Syllabication in guiding pupils to divide words into syllables and thus unlock unknown words.
3. Structural analysis in which students learn to divide words into prefixes, suffixes and root words.
4. Configuration clues whereby learners perceive shape or form of specific words for identification purposes.
5. Picture clues whereby a picture provides the identification of unknown words.
6. Context clues in helping students to identify a word within the confines of a sentence. The unknown word must make sense with other words contained in the sentence.

Additional uses for microcomputers include drill and practice, as well as simulations and games. Wright and Forcier listed the following criteria for software selection for drill and practice as well as simulations and games:

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Criteria for Drill and Practice Programmes	*Criteria for Simulations and Games*
1. Format is interactive	1. Clear direction
2. User can establish the pace	2. Simple keyboard paddle use
3. Provision made for progression in levels of difficulty	3. Varying levels of difficulty
4. Items at the same level of difficulty can be selected at random	4. Realistic situation for role-playing
5. Employs motivational techniques	5. High level of interest maintained throughout
6. Rewards for correct responses	6. Results predicated on user input
7. Incorrect responses handled appropriately	
8. Teacher can modify content	

VIII. ***Use of computers in methodology of educational administration and management:***

1. Keeping records of finances, fees and donations, etc.
2. Compiling results.
3. Preparing graphs, drawings and lists from the data whenever required.
4. Scheduling daily activities.
5. Reminding about specific times and dates when certain things must be done.
6. Providing information about professional questions (when hooked to a national data bank).
7. Helping in word processing and several other personnel tasks.
8. Maintaining record of school staff.

IX. ***Computer and improvement in the effectiveness of instruction:***

1. The computer assisted instruction is individualized.
2. The computer can be programmed to interact meaningfully with the student to enable him to overcome his learning difficulties.
3. The revelatory form of CAI assists the student to learn through a process of gradual recovery.
4. CAI enables the student to make models of real life situations, formulate and test ideas and hypotheses.
5. A student learns to use the computer in solving difficult problems.
6. The computer data bank helps the student to obtain data and process it quickly and meaningfully.
7. A student can take a test with the computer and can obtain immediate feedback so that he can rectify his mistakes and improve his learning.
8. A computer can be used in several innovative ways to improve learning.

Limitations of CAI

1. Speech or analysis written by the computer seems to be possible only outer several years.

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2. The computer fails to appreciate the emotions of the students. The warmth and the emotions exuded by the teacher in direct classroom interaction with the students is missed by the students in CAI.
3. The peripheral equipment put constraints on the ways in which a student can interact with the computer.
4. Commenting upon the limitations of the computer, Longuit— Higgins have opined, 'The human student is a rather rich information source. Reducing him to a short of morse code consisting of a string of multiple choice answers we lose a lot of this information and so reduce the possibility of understanding his difficulties.'
5. CAI fails to develop essential features of language competency.
6. Some students get more tired in CAI than conventional study.
7. CAI is a sort of mechanical approach to education.

Functions of the school administration and the teacher in relation to the use of computer in education

1. New functions of the teacher will depend upon the specific purpose for which the computer is used.
2. A technical expert should be consulted in the selection and purchase of hardware.
3. An agreement should be made with the suppliers for the supply and installation of the computer.
4. One or two persons of the school should be trained in operation and servicing of the computer.
5. A small centrally located room should be selected for the installation of the computer.
6. Storage space should be provided for software programmes.
7. A teacher called as 'computer manager' or 'computer resources person' shall be the overall incharge of the computer. He will coordinate the entire work in this regard.
8. In CAI the teacher has the chance to use new tools which will enhance his individual satisfaction and increase his efficiency.
9. The teacher will be liberated from his routine duty.
10. The teacher will be in a position to produce elaborate graphs and tables.
11. The teacher can compute accurately and rapidly huge data. Computers can never be a threat to teachers. The computer is after all a tool itself incapable of action. It has no inborn wisdom. It carries out with incredible speed the instructions given to it. One can store and retrious data swiltly from a computer. The instructions nevertheless have to be given to it by the teacher. The computer therefore is a medium or tool in the teaching/learning process. It is the teacher who is to decide which part of the curriculum the computer can handle. It can be the flashing of a piece of text with blanks for teaching or a multiple choice question with alternatives on the display screen for testing and recording the student's score.

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Developing competence of teachers and administrators in using microcomputers

For achieving proficiency in computer usage, the following means may be utilized:

1. Organizing workshops stressing the relevant objectives.
2. Conducting faculty meetings containing vital agenda items.
3. Arranging video remove tape presentations on model procedures in computer usage.
4. Showing slides, filmstrips, and films presenting sequential significant content.
5. Planning talks by qualified resource personnel to participants on curriculum and uses of the computer.
6. Visiting classrooms in which effective computer usage is being stressed.

In-service education for teachers and administrators in micro-computer use in the curriculum should:

1. provide sequential new learning.
2. emphasize utilitarian values in teaching and learning situations
3. stress meaningful and understandable content
4. inculcate the goals or reasons for learning

Type of CAI programmes

1. Logo: This system developed by Feurzeing and Papart pro-vides instruction which can be used to produce pictures on an oscilloscope or make a little mechanical robot. Often the students suggest their own tasks and then write appropriate programmes.

2. Simulation and gaining: This system enables the student to mount an experiment in a symbolic form. For instance, experiments involving the breeding of fruit flies are often used in teaching genetics.

3. Controlled learning: Controlled learning involves the use of interesting adaptive strategies. It includes both drill and practice. Drill and practice programmes are supplementary to the regular curriculum followed by the classroom teacher.

Devices used in CAI: Ronald Gentile mentions the following devices used in CAI:

1. Students can ask a question by typing a question on the keyboard attached to the computer.
2. Film projection devices, on the basis of student responses, select films, present auditory and visual material and automatically score students responses.
3. Displays super imposed on 'films' highlight certain concepts of the films.
4. With Cathode-ray tubes a pen can be used for drawing curves or indicating on a screen. These answers can then be evaluated by a computer.
5. Random-access slides and films. These are two devices developed for auditory communication. They are:
   (i) *Complied Speech*—Here the computer has random access to pre-recorded phrases which can be arranged on the basis of the student's response. For example, the computer can tell the student a chemical formula.

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   (ii) *Synthetic Speech*—Here the computer uses a set of rules to convert stored speech and sounds into meaningful patterns.

Origin of computer-aided assisted instruction

Computer-aided instruction (CAI) dates back to the early 1960s. Introduction of micro computers in 1980s generated a new enthusiam to use it for instructional purposes. The first major pioneering attempt in CAI was made in the USA in 1961 when the University of Illinois produced Programmed Logic for Automatic Training Operations (PLATO). The second landmark in CAI was in the year 1966 when computerized tutorials in arithmetic and reading for elementary school children were developed by Patrick Suppes of Stanford University.

Tbndow (1966) used a computer to teach fifth graders the elements of binary system, some computer vocabulary and the know-how of computer operations. Schurdak (1966) used computer to teach a FORTRAN course and found it more effective than other conventional methods. Atkinson (1968) developed programmes for the computer-based instruction in reading using IBM-1500 instructional system in which each student terminal consists of a picture projector, a cathode ray tube (CRT), a light pen, a typewriter keyboard and an audio system playing pre-recorded messages.

These days, microcomputers are being used on a regular basis widely at all levels of education from primary level to university level.

Computer-Assisted Instruction (CAI) has become an integral part of the learning process in the advanced and developed countries of the world. For instance, a survey of instructional technology in schools of the United Kingdom in 1989 revealed the following.

A. Primary schools

1. There were on an average 2.5 micro-computers (micros) per school.
2. The average number of pupils per computer was 67.
3. Nearly 60 per cent of information technology resources were met from public funds and the rest were met from other sources such as Parent-Teacher Association.
4. Half the teaching staff were making a significant use of micro-computers on a regular basis.
5. Nearly all pupils have 'hand on' experience of micro-computers.

B. Secondary schools

1. There were on an average 23.2 micro computer in every school.
2. The average number of pupils per computer was 32.
3. 80 per cent information technology resources were met from public funds and the rest from other sources such as Parent-Teacher Association.
4. Nearly three-quarters of pupils have 'hands on' experience of mini-computers.

Working of a computer

A computer is a power-driven machine equipped with keyboards, electronic circuits, storage, compartments and recording devices for the high speed performance of mathematical operations. In simple terms, a computer is a 'glorified computer', however, with a differ-ence. The computer is a box loaded with information. The processes and formulae necessary to process information are also fed in the computer. When related information is given to it, it interacts and manipulates the information, translates the answer and types it out on a type writer.

A computer has five basic parts:

1. Input equipment to feed information to the system.
2. Output equipment to indicate the results of processing usually on a visual display unit (TV screen) and/or print out.
3. A memory store to hold information.
4. A processing unit to perform the required information.
5. A control unit, for processing controlling in such a way that all elements operate in harmony.

Memory: The computer can store information fed into its memory. Memory is of two types—main memory in the form of silicon chips and backing store in the form of magnetic tapes. The main memory is used to hold programmes and information needed to carry out a particular processing task.

Computer hardware and software: The physical components of the computer are called hardware. The programmes which contain instructions to the computer in a language that it can understand are called software.

Software programmes: The programmes used by the user to play a game, to learn from a computer-assisted course, to solve a numerical problem to classify a large mass of data etc. are examples of applications of software.

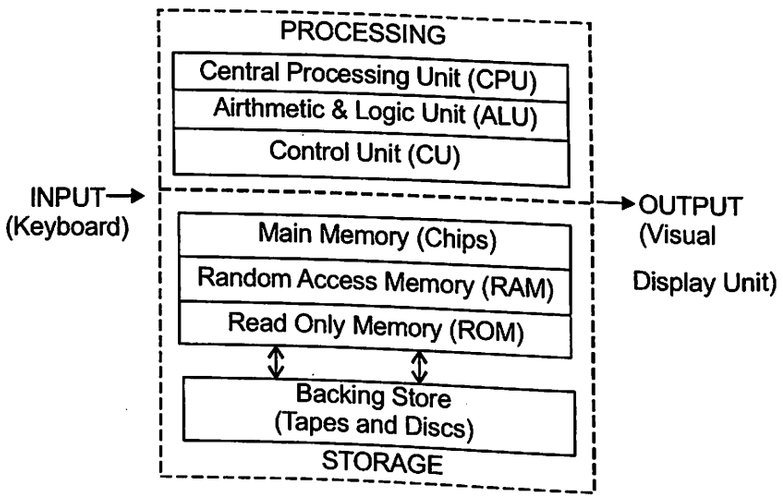


Fig. 8.2 Basic Elements of a Computer

Significant facts and statements regarding computers and their use in education

A. General facts and statements regarding computer

1. The computer was developed out of man's search for a machine which could do long and laborious calculations easily and with great speed.
2. The design of Analytical Engine developed by Charles Babbage in 1883 laid the foundation of modern computer.
3. In 1943, the first computing machine was constructed by International Business Machines Corporation in USA.
4. From 1970 onwards, the size of the computers as well as their cost was drastically reduced.
5. After 1970 computers began to be used increasingly in education—schools, colleges and universities.
6. After 1974, micro-computers also known as personal computers were available.
7. Depending on the size, processing power and cost, computers are divided into three categories, namely mainframe computer, minicomputer and micro-computer.
8. Computers can be used for (i) Creative music (ii) Data base (iii) Education (iv) Graphic design (v) Mathematical work (vi) Simulated work (vii) Word processing.
9. Fortan was the high level language suited to scientific applications that emerged in 1957.
10. COBOL (Common Business Oriented Language) developed in the late 1950's to meet the requirements of commercial applications.
11. BASIC (Beginners All-purpose Symbolic Instruction Code) was developed in the early 1960s.

Statements and facts regarding computer-aided instruction (CAI)

1. Providing programmed instruction through the computer is called CAI.
2. In the 1960s, some universities used computers for presenting programmed instructional material.
3. In 1961 CAI was used in the University of Illinois in USA.
4. In 1966 Tondow used a computer to teach fifth graders.
5. In 1966, Schurdak used computer to teach a FORTAN course.
6. Again 1966, Patrick Suppes of Stanford University computerized tutorials in arithmetic and reading for elementary school children.
7. In generative CAI, the computer generates questions within a basic framework of a topic.
8. Computer Managed Learning (CML) is concerned with the use of computer to perform the tedious and time-consuming management tasks of learning.

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9. For facilitating computer scoring, objective type questions preferably of multiple-choice and alternate responses are given.
10. The computer can be used as a test-item bank and for obtaining several different tests using the item-bank.
11. By quickly reviewing the performance of the student in the previous courses, the computer can be used to suggest future courses for the student.
12. CML system is used to maintain records of students which is made available to them and their tutor.
13. The CML system can issue timely reports to students, teachers and administrators.
14. Based on student records, the CML system can give to the student vocational guidance.
15. Four administrative uses of the computer in education are: (i) Student administration (ii) Financial administration (iii) Resources administration and (iv) Library administration.
16. Some of the advantages of using CML are: (i) Saving in cost and resources (ii) Saving in time and effort (iii) Improving effec-tiveness of learning.

Computer Education Programme in Schools in India

A Pilot Project on Computer Literacy and Studies in Schools (CLASS) was initiated in 1984-85 in 248 selected Secondary/Higher Secondary schools. The objective is to acquaint students and teachers with the wide range of computer applications and its potential as a learning medium. By the end of 1988-89, about 2600 schools had been covered. Sixty resource centres had been set up to train school teachers and provide support to the participating schools. Efforts have been made to start generation of indigenous software through NCERT, New Delhi. The Project is jointly co-ordinated and supported by the Department of Electronics, the Department of Education, Computer Maintenance Corporation (CMC) and the NCERT.

Under the existing arrangements, CMC Ltd., is responsible for procurement, installation and maintenance of hardware in schools, while NCERT is responsible for academic inputs including teacher training and monitoring through 61 Resource Centres, Engineering colleges and Universities throughout the country. The schools are selected by the government in consultation with the concerned state government.

In a review undertaken by the Ministry of Human Resource Development, a number of shortcomings, in its implementation were noticed. Chief of these shortcomings were:

- multiplicity of agencies involved
- instructions outside school hours
- inadequate training of teachers and inadequacy of instruc-tional material
- no set curriculum

Attempts are being made to remove these shortcomings.

Concluding Remarks

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Inspite of the unprecedented impact of CAI on education in advanced countries, it has not made much headway in India. On account of several reasons, India has not been able to introduce CAI on a substantial scale. In fact, computers in education are hardly used by the teachers as a as their classroom instructional work is concerned. CAI must be tried out in selected areas of instruction in the first instance. It appears the in that near future, as the situation is, there are remote possibilities of the use of this new medium of classroom communication on an appreciable scale, in our educational institutions. Resource crunch seems to be the greatest hurdle in this context. Classes are overcrowded and educational institutions in general lack suitable accommodation and basic equipment.

The introduction of computers in education is not a quick and easy path to follow. But to be at par with the developed countries we can hardly afford to ignore its importance in education. If we want successful introduction of this technology in education, a more comprehensive plan is needed to be developed to give the practical knowledge of basic skills to operate the equipment, understanding of basic principles and awareness of main applications, ability to design and prepare a software, etc., to the maximum number of teachers.

8.3.1 Personalized System of Instruction (PSI)

Personalized System of Instruction (PSI) or the Keller Plan was developed by Fred S. Keller in 1965. It is a plan of individualized instruction. Still it retains the merits of collective instruction to a great extent. It is felt that Keller plan is definitely a better approach to learning than the conventional spoon-feeding method of lecturing in the classroom. The plan is better suited for college level instruction.

Chief characteristics: The Keller plan is a sequence of three-step cycles of learning process with presentation, response and consequence arranged in such a way as to optimize learning. The course policy is explained to the students in the beginning and he is given the study guide. The flow chart in figure 8.3 explains the various processes involved in the Keller Plan.

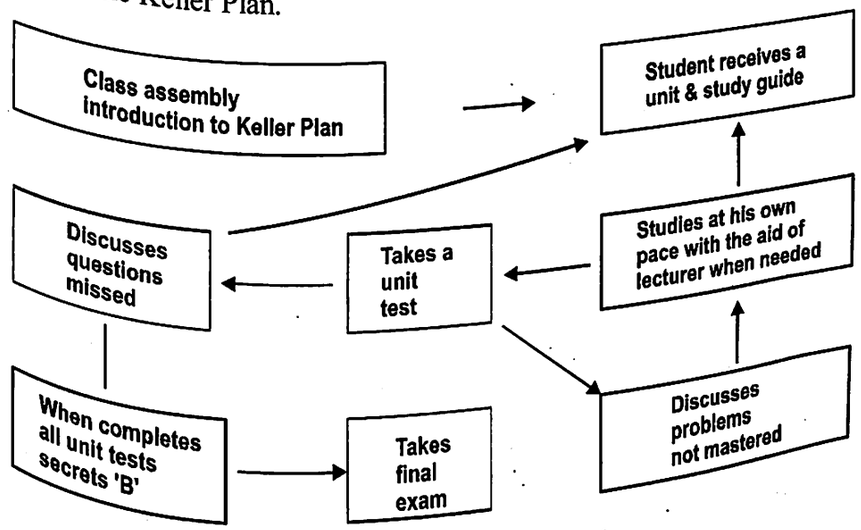


Fig. 8.3 Flow Chart of Keller Plan

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The course content is roughly divided into (12 – 20) units which can be mastered by a student in about a week. The student is expected to master every unit at his own pace. The student first gets unit-1 along with the study guide. The study guide is prepared by the teacher. It gives explicit objectives which the student has to achieve. When the student has achieved the objectives, he will take the unit test.

The duration of the unit test is usually from 20 to 25 minutes and its scores are prepared in 5 minutes. Textbooks and study guides comprise the learning material. The structure and organization of a study guide includes instruction for each unit, behavioural objectives, procedure, text supplement and test questions. The procedure consists of what is to be read, where to look for, where rote learning is necessary and where comprehension is necessary. For each unit, four equivalent but different forms of readiness tests are provided. The instructor goes from student to student and solves the problems of every individual. The student takes the readiness test provided he thinks that he has fulfilled the behavioural objectives. The test is scored in the presence of the student with his verbal clarifications. If he clears the test without any conceptual mistake, he is provided with the study guide for the next unit. Otherwise he has to attend to the areas requiring further study and appear for the test again. He is given the re–test, which may be old or new or on-the-spot constructed test depending upon the need. After completion, he goes for the next unit. After a little progress, some high pacers are selected from the students to act as proctors (internal as against external wherever possible). The proctors help the instructor in the one-to-one contact with the students when they are studying, and administering and scoring of the tests. Proctors are issued with proctors' guide sheets wherein their duties and the extra material they have to study is mentioned. Proctors are rewarded for their additional labour, interest and regularity. Each proctor is incharge of a certain number of peers (classmates).

There will be some review tests also to assess the of the students. Enrichment activities are also provided, which carry credit or motivational value. These enrichment activities include extension lectures, work visits or experimental work.

Advantages of PSI

Same of the advantages of PSI are:

1. Every student with all his intellectual, psychological, socio-economic status, interest and aptitude, is considered as a class in himself.
2. Students learn at their own pace rather than at the instructor's pace.
3. Maximum use is made of the tested concepts of educational technological methods, viz., feedback to the instructor and continuous formative tests.
4. It does not require costly sophisticated media of educational technology.
5. Environment of cooperation is built due to the taken cave of proctor's guidance.
6. Readiness of the students is taken care of.
7. Negative reinforcement, i.e., punishment is avoided.
8. Importance is given to the written word in the study guides and readiness test.
9. The students learn through self-learning.
10. Learning in the students is visible and the teacher acts as a learning facilitator.

Following points may be kept in view while making use of PSI:

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1. In the very beginning, students may be explained the efficacy and usefulness of this system.
2. A handout on the scheme should be prepared and given to each student in the very beginning of the course.
3. Behavioural objectives should be specified.
4. A suitable textbook which satisfies most of the behavioural objectives should be selected and each student should be asked to possess this book.
5. The whole curriculum should be broken into units which can be mastered in about a week. The number of units will approximately be equal to the number of weeks available. Units need not be sequenced as in the curriculum or in the textbook.
6. Study guides for each unit should be prepared. Study guides will be structured in the following ways:
   (i) Introduction—Need and importance of the unit. Teacher's comments—summary or synopsis prerequisites.
   (ii) Behavioural objectives.
   (iii) Procedures—objective reference to the page or article numbers in the textbook. There may be portions marked for an individual for comprehension or rote learning, or for study only or for experimentation.
   (iv) Study questions for self-test by the learners.
7. Readiness tests—3 or 4 equivalent forms for each task, covering all objectives in that task should be written. Readiness tests should contain test items which are objective or subjective, descriptive or problem-solving type and/or performing an experiment or doing a job. The size of a test should normally be such that it takes 15-20 minutes for a student to attempt and 5-8 minutes for the instructor to check.
8. Proctors should be selected from any of the following, in order of priority—colleagues, research assistants who have passed the course, senior students, high pacer classmates called as internal 'procts'. If possible, the proctors should be rewarded in some form. There should be one proctor for every 10 students.
9. Manuals for proctors, giving the page numbers of textbook or other references or supplementary text which the proctors can use in guiding the student, should be prepared. If the proctors are not from the students of the same class then the key to the readiness tests may also be included. A structured interview by the proctors with his peers may also be included.
10. A progress report indicating the desirable dates for assessing the different tasks should be prepared.
11. Marking policy, if any, should be decided.
12. PSI classroom should be arranged into four functional areas: (i) Quiet study, (ii) tutoring, (iii) test taking (iv) evaluation.
13. Some enrichment activity in the form of extension lectures, field trips, etc., may be planned.

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14. The instructor should have weekly meetings with the proctors to discuss about any problem encountered, progress of the students and briefing of the proctors.
15. Feedback may be obtained from the students and the proctors, regarding their attitudes about PSI: one at the mid session to make any changes in the process and another at the end of the course.
16. The instructor should maintain a student-wise progress record and an anecdotal record for his future reference.

Follow up: The instructor should go through the anecdotal record to identify the bottlenecks. He may have to revise the study guides, readiness tests, proctors manuals, the procedure, the progress chart and records keeping.

It will be desirable that the teacher shares his experience with the faculty members and others outside his Institute through reports.

Limitations and points of criticism

1. Teachers may not have the necessary enthusiasm to try new ideas.
2. Teachers may feel that they are not rewarded for their work.
3. Teachers may find it difficult to write specific behavioural objectives.
4. Teachers may feel satisfied with their existing teaching techniques.
5. Mastery of learning is ignored.
6. Adequate test or notes are not readily available.
7. The subject matter changes quickly.
8. There are large number of students in every classes.
9. Teachers are bound to give lectures for long hours.

PSI course is an interesting and rewarding job. At the same time it is not difficult to use. It does not require elaborate physical plant. It utilizes conventional classroom facilities. It easily adapts to the time provision in traditional courses–3 hours per week and proportionately for semester and trimester courses. It relies on traditional texts. Other hardwares and softwares of educational technology can be used in it.

Learner-Controlled Instruction (LCI)

This method of individualized instruction was developed by Robert Mager in 1951. It is based on the belief that a student should be a source of significant input to the sequencing decision. It follows this approach, 'Let the students know that they could ask any question they wished about a topic, they wished to study, for example, electronics and let then get on with it using the instructor as a resource person.'

The most important feature of LCI is that it is a kind of Socratic dialogue in the reverse sense. In Socratic dialogue, the teacher leads the learner gradually to the desired goal but in learning controlled instruction, the learner leads the teacher to the desired goal by asking questions.

Pointing out the importance of the learner in the instructional process, Mager observed, 'Although we pay verbal tribute to the business of taking the learner from where he is to some other place, we generally, fail to consult the learner in the matter except to ask him to help us to maximize the effectiveness of whatever sequences we have already decided upon.'

Merits of learner-controlled instruction

1. In learner-controlled instruction, the learner himself organizes the learning sequences according to his own mental abilities and this creates confidence in him.
2. It encourages reciprocal respect and a friendly emotional environment between the learner and the teacher.
3. Since the goals are set by the learners themselves, they become meaningful, realistic, satisfying and helpful in guiding their learning activities.
4. There is high motivation to learn because the need to learn emerges from the curiosity of the learner.
5. The teacher carefully studies the interests and needs of the learners in order to help them to realize their goal.
6. The activities and experiences of the learners are enriched and supplemented by the use of related materials.
7. The learner engages in active and real life experiences which are related to one another.
8. There is continuous evaluation of the learner and the programme.

Demerits

1. Developing a programme in learner-controlled instruction is very costly and time consuming.
2. No two individual learners are alike and this would necessitate the writing of the programme for the learner every year.
3. The learner may not be able to sequence his learning task.

8.3.2 Security Awareness Instructor (SAI)

The SAI is a modern, professional certification which assures applicable knowledge, skills, ethics, approach, and responsibility for teaching security. The SAI focus is on the method for assuring a quality training.

8.3.3 Modular Teaching Approach

Modular teaching is one of the most popular teaching-learning techniques in the West as well as in Asia. The approach is used in almost all subjects such as natural science, education, social science and computers. It is a recent development based on programmed learning. It takes into account the learning capability of a learner, which necessitates the planning for adoption of the most appropriate teaching techniques to help the individual grow and develop at one's own space.

Characteristics of a modular approach are:

(i) Should be independent

(ii) Self-contained

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(iii) Self-instructional
(iv) Well defined
(v) Clear in objectives
(vi) Concerns individual differences
(vii) Have systematically organized learning opportunities
(viii) Utilizing all types of media
(ix) Active participation by learners
(x) Immediate reinforcement of responses
(xi) Mastery of evaluation strategy
(xii) Evaluation of work

The approach should have some basic components, such as:

(a) **Rationale:** A complete and clear picture of the module and clarity of the need for the study.

(b) **Objectives:** The probable outcome of the module, which should be stated in terms of behaviour and performance.

(c) **Entry test:** To evaluate whether the learner has prerequisite skills to enter the module.

(d) **Multi-media material:** Utilization of the available variety of media to actively involve learners.

(e) **Learning activities:** A variety of learning activities can be used to catch the attention of the learners, such as, presentation, demonstration, drill, stimulation and problem solving.

(f) **Self-test:** A process to review and assess one's progress.

(g) **Post test:** To check whether the objectives have been attained.

Analysing the modular approach to teaching, it becomes clear that it is a more effective, updated and technology-based method. It provides flexibility to distance teaching mode as well as to learners.

8.4 SUMMARY

In this unit, you have learnt that:

- Some of the important technologies in education that have combined to make the communication revolution and information age a challenging era for educators are: (i) Computers (ii) Video (iii) Telelecture (iv) Teleconferencing (v) Videotex (vi) Internet (vi) Artificial Intelligence.
- AI is a branch of computer science that deals with the task of making intelligent machines that can perform better than humans.
- ROM is a semi-conductor memory device which is used to store information of a permanent nature. It is non-volatile memory which means that retains the stored data even when the power to the device is shut off.
- Dial access is a round-the-clock delivery system through which callers can get access to a vast library of audio cassettes.
- Teleconferencing or interactive television is a two-way electronic communication between two or more groups or three or more individuals who are at separate locations.

Check Your Progress

6. Name the person who developed the Personalized System of Instruction (PSI) or the Keller Plan.
7. List some of the merits of learner-controlled instruction (LCI).

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- The three types of teleconferencing are: (i) Audioconferencing (ii) Videoconferencing (iii) Audiographic teleconferencing.
- Telelecture is primarily a one-way information transmission taken by its teacher with a very limited opportunity of questions or comments.
- Video is an important medium of learning which is being used on a large scale in modern times. Video technology allows playback of programmes.
- Videotex involves the transmission of display text and graphics and their reception on a television set. Videotex is of two types: (i) Broadcast Videotex (Telecast), and (ii) Interactive Videotex (View Data).
- Video-teleconference is a teleconference that includes video communications.
- Recently virtual university has come into existence. People are studying in virtual classrooms. One need not travel to other countries for educational purposes.
- Internet is the abbreviation of inter-network systems and is described as a network of the computer system.
- The Internet which began in 1968 in the United States Depart-ment of Defence Research is a new communication technology that is affecting our lives in a scale as significant as the telephone and the television.
- Some of the abilities and skills needed for the Internet are: (i) Basic knowledge of computer. (ii) Familiarity with multimedia software (iii) Familiarity with Internet software (iv) Communication with the resource person.
- Computer Assisted Instructions (CAI) aid the learning process in the following ways: (i) By asking questions (ii) By stimulating processes. (iii) By doing difficult calculations. (iv) By providing information from a large store.
- A computer is a power-driven machine equipped with keyboards, electronic circuits, storage, compartments and recording devices for the high speed performance of mathematical operations.
- A Pilot Project on Computer Literacy and Studies in Schools (CLASS) was initiated in 1984-85 in 248 selected Second-ary/Higher Secondary schools. The objective is to acquaint students and teachers with the wide range of computer applications and its potential as a learning medium.
- Personalized System of Instruction (PSI) or the Keller Plan developed by Fred S. Keller in 1965 is a plan of individualized instruction. It is felt that Keller plan is definitely a better approach to learning than the conventional spoon-feeding method of lecturing in the classroom.
- Learner Controlled Instruction is an individualized instruction which was developed by Robert Mager in 1951. It is based on the belief that a student should be a source of significant input to the sequencing decision.
- Modular teaching is one of the most popular teaching-learning techniques in the West as well as in Asia. The approach is used in almost all subjects such as natural science, education, social science and computers.

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8.5 KEY TERMS

- **Artificial Intelligence (AI):** AI is a branch of computer science that deals with the task of making intelligent machines that can perform better than humans
- **Dial access:** Is a round-the-clock delivery system through which callers can get access to a vast library of audio cassettes.
- **Teleconferencing:** Is a new form of video-based communication via telephone lines or satellite broadcast.
- **Videotex:** Is an information service in which data is transmitted over television cables or telephone lines and displayed on a television or computer screen.

8.6 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Some of the equipments needed in teleconferencing are:
   (i) Satellite transponder
   (ii) Stubs
   (iii) A studio uplinked with the earth stations that can uplink the programme to the satellite and reception centres with direct reception facilities which can download the programmes uplinked from the studio of the stub.
   (iv) Telephone
   (v) STD
   (vi) Computer network
2. Some of the benefits of teleconferencing are:
   (i) Teleconferencing enables the possibility of holding meeting that could not otherwise have taken place due to financial, time or other such constraints.
   (ii) It enables visual participation of remote students.
   (iii) Teleconferencing connects educational facilities worldwide by imparting distance learning and employee training.
3. Some of the merits of a videotape recorder are:
   (i) Tape can be played back as soon it is made.
   (ii) Tape can be erased and re-used several times.
   (iii) It is easily distributed and used.
4. Some of the facilities offered by the Internet are:
   (i) Transfer of files among computers and using file transfer protocol.
   (ii) Access to another remotely located computer through one's own computer.
   (iii) E-mail
5. Some of the abilities and skills that are needed for the Internet are:
   (i) Basic knowledge of computer.
   (ii) Familiarity with multimedia software.
   (iii) Familiarity with Internet software.
   (iv) Storing and retrieving information from the Internet and multimedia.
   (v) Communication with the resource person.
6. Fred S. Keller developed the Personalized System of Instruction (PSI) or the Keller Plan.
7. Some of the merits of learner-controlled instruction are:
   (i) In learner-controlled instruction, the learner himself organizes the learning sequences according to his own mental abilities and this creates confidence in him.
   (ii) It encourages reciprocal respect and a friendly emotional environment between the learner and the teacher.
   (iii) The activities and experiences of the learners are enriched and supplemented by the use of related materials.
   (iv) There is continuous evaluation of the learner and the programme.

NOTES

8.7 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What is artificial intelligence?
2. List the merits of dial access.
3. Write short notes on (a) teleconferencing (ii) interactive video (iii) videotex.
4. List the merits of using the Internet.
5. What are the limitations of computer-assisted instruction (CAI)?
6. Write a short note on computer education programme in schools in India.

Long-Answer Questions

1. Explain the classification of teleconferencing according to the media used.
2. What is a virtual university?
3. Describe the working of the Internet.
4. Explain briefly the use of computers in imparting education.
5. What are the merits and demerits of the personalized system of instruction (PSI)?
6. What is a learner-controlled instruction?

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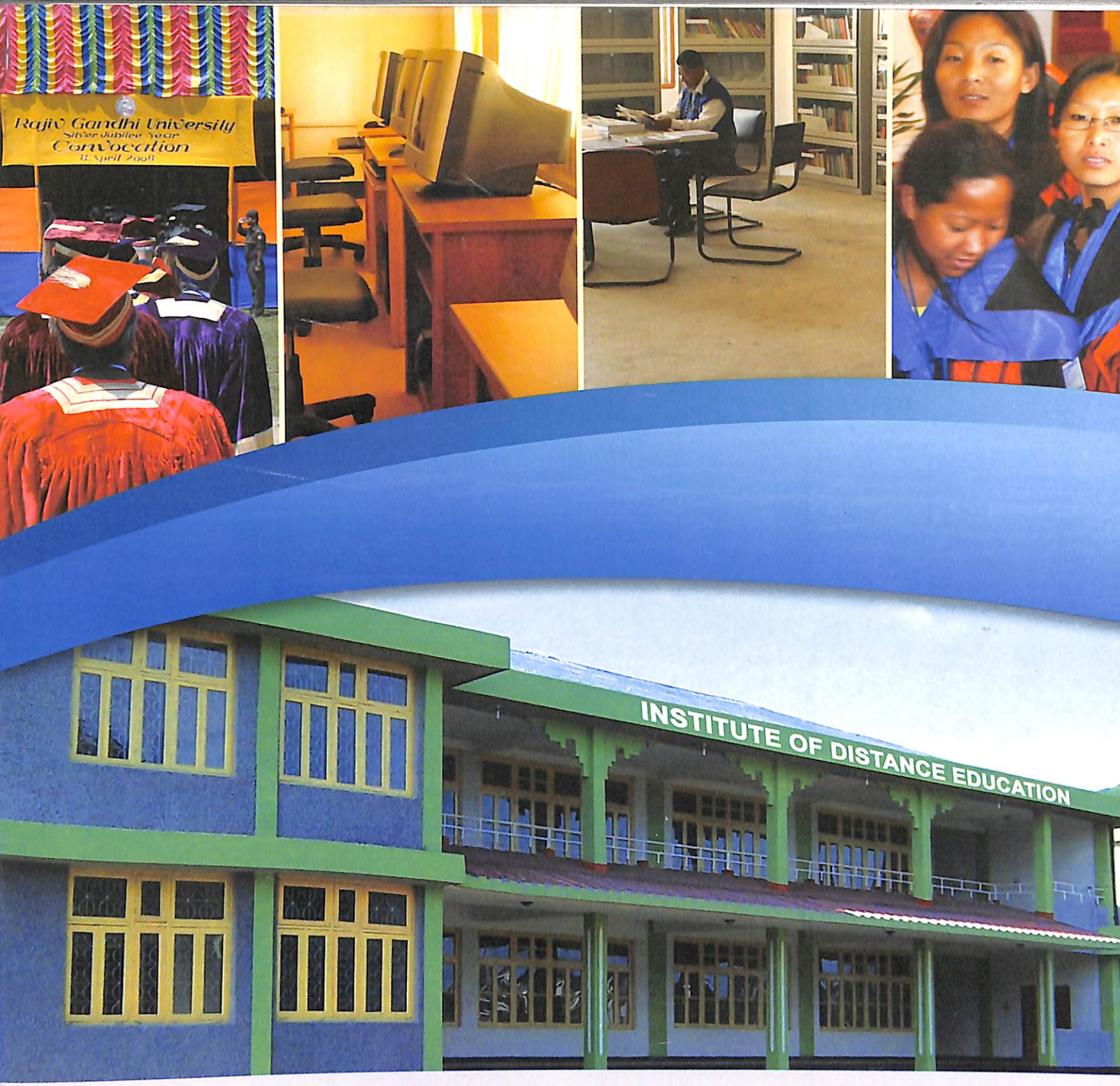
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M.A. (Education)

SECOND YEAR

MAEDN-502

INSTITUTE OF DISTANCE EDUCATION
Rajiv Gandhi University

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CURRICULUM DEVELOPMENT

CURRICULUM DEVELOPMENT

MA [Education]

Second Year

MAEDN 502

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About the University

Rajiv Gandhi University (formerly Arunachal University) is a premier institution for higher education in the state of Arunachal Pradesh and has completed twenty-five years of its existence. Late Smt. Indira Gandhi, the then Prime Minister of India, laid the foundation stone of the university on 4th February, 1984 at Rono Hills, where the present campus is located.

Ever since its inception, the university has been trying to achieve excellence and fulfill the objectives as envisaged in the University Act. The university received academic recognition under Section 2(f) from the University Grants Commission on 28th March, 1985 and started functioning from 1st April, 1985. It got financial recognition under section 12-B of the UGC on 25th March, 1994. Since then Rajiv Gandhi University, (then Arunachal University) has carved a niche for itself in the educational scenario of the country following its selection as a University with potential for excellence by a high-level expert committee of the University Grants Commission from among universities in India.

The University was converted into a Central University with effect from 9th April, 2007 as per notification of the Ministry of Human Resource Development, Government of India.

The University is located atop Rono Hills on a picturesque tableland of 302 acres overlooking the river Dikrong. It is 6.5 km from the National Highway 52-A and 25 km from Itanagar, the State capital. The campus is linked with the National Highway by the Dikrong bridge.

The teaching and research programmes of the University are designed with a view to play a positive role in the socio-economic and cultural development of the State. The University offers Undergraduate, Post-graduate, M.Phil and Ph.D. programmes. The Department of Education also offers the B.Ed. programme.

There are fifteen colleges affiliated to the University. The University has been extending educational facilities to students from the neighbouring states, particularly Assam. The strength of students in different departments of the University and in affiliated colleges has been steadily increasing.

The faculty members have been actively engaged in research activities with financial support from UGC and other funding agencies. Since inception, a number of proposals on research projects have been sanctioned by various funding agencies to the University. Various departments have organized numerous seminars, workshops and conferences. Many faculty members have participated in national and international conferences and seminars held within the country and abroad. Eminent scholars and distinguished personalities have visited the University and delivered lectures on various disciplines.

The academic year 2000-2001 was a year of consolidation for the University. The switch over from the annual to the semester system took off smoothly and the performance of the students registered a marked improvement. Various syllabi designed by Boards of Post-Graduate Studies (BPGS) have been implemented. VSAT facility installed by the ERNET India, New Delhi under the UGC-Infonet program, provides Internet access.

In spite of infrastructural constraints, the University has been maintaining its academic excellence. The University has strictly adhered to the academic calendar, conducted the examinations and declared the results on time. The students from the University have found placements not only in State and Central Government Services, but also in various institutions, industries and organizations. Many students have emerged successful in the National Eligibility Test (NET).

Since inception, the University has made significant progress in teaching, research, innovations in curriculum development and developing infrastructure.

About IDE

The formal system of higher education in our country is facing the problems of access, limitation of seats, lack of facilities and infrastructure. Academicians from various disciplines opine that it is learning which is more important and not the channel of education. The education through distance mode is an alternative mode of imparting instruction to overcome the problems of access, infrastructure and socio-economic barriers. This will meet the demand for qualitative higher education of millions of people who cannot get admission in the regular system and wish to pursue their education. It also helps interested employed and unemployed men and women to continue with their higher education. Distance education is a distinct approach to impart education to learners who remained away in the space and/or time from the teachers and teaching institutions on account of economic, social and other considerations. Our main aim is to provide higher education opportunities to those who are unable to join regular academic and vocational education programmes in the affiliated colleges of the University and make higher education reach to the doorsteps in rural and geographically remote areas of Arunachal Pradesh in particular and North-eastern part of India in general. In 2008, the Centre for Distance Education has been renamed as "Institute of Distance Education (IDE)."

Continuing the endeavor to expand the learning opportunities for distant learners, IDE has introduced Post Graduate Courses in 5 subjects (Education, English, Hindi, History and Political Science) from the Academic Session 2013-14.

The Institute of Distance Education is housed in the Physical Sciences Faculty Building (first floor) next to the University Library. The University campus is 6 kms from NERIST point on National Highway 52A. The University buses ply to NERIST point regularly.

Outstanding Features of Institute of Distance Education:

(i) At Par with Regular Mode

Eligibility requirements, curricular content, mode of examination and the award of degrees are on par with the colleges affiliated to the Rajiv Gandhi University and the Department(s) of the University.

(ii) Self-Instructional Study Material (SISM)

The students are provided SISM prepared by the Institute and approved by Distance Education Council (DEC), New Delhi. This will be provided at the time of admission at the IDE or its Study Centres. SISM is provided only in English except Hindi subject.

(iii) Contact and Counselling Programme (CCP)

The course curriculum of every programme involves counselling in the form of personal contact programme of duration of approximately 7-15 days. The CCP shall not be compulsory for BA. However for professional courses and MA the attendance in CCP will be mandatory.

(iv) Field Training and Project

For professional course(s) there shall be provision of field training and project writing in the concerned subject.

(v) Medium of Instruction and Examination

The medium of instruction and examination will be English for all the subjects except for those subjects where the learners will need to write in the respective languages.

(vi) Subject/Counselling Coordinators

For developing study material, the IDE appoints subject coordinators from within and outside the University. In order to run the PCCP effectively Counselling Coordinators are engaged from the Departments of the University, The Counselling-Coordinators do necessary coordination for involving resource persons in contact and counselling programme and assignment evaluation. The learners can also contact them for clarifying their difficulties in then respective subjects.

SYLLABI-BOOK MAPPING TABLE

Curriculum Development

	Syllabi	Mapping in Book
UNIT I	**Introduction to Curriculum Development:** – Meaning, nature and scope of curriculum – Principles of curriculum construction – Concept of curriculum development – Components of curriculum	**Unit 1:** Introduction to Curriculum Development **(Pages 3-38)**
UNIT II	**Foundations of Curriculum Development:** – Philosophical – Psychological – Sociological – Historical	**Unit 2:** Foundations of Curriculum Development **(Pages 39-75)**
UNIT III	**Process of Curriculum Development:** – Situation analysis and formulation of aims and objectives – Identification of learning experiences and activities – Organization of learning experiences and activities Evaluation	**Unit 3:** Process of Curriculum Development **(Pages 77-91)**
UNIT IV	**Curriculum Design:** – Sources of Curriculum Design – Types of Curriculum Design: Subject -centered, experience-cum-activity centered, undifferentiated and differentiated, learner -centered, problem centered design. – National Curriculum Framework for Secondary Education 2005 (NCFSE)	**Unit 4:** Curriculum Design **(Pages 93-119)**
UNIT V	**Curriculum Evaluation:** – Meaning, Nature and Need of Curriculum Evaluation – Types of Curriculum Evaluation. – Tools and Techniques of Curriculum Evaluation.	**Unit 5:** Curriculum Evaluation **(Pages 121-139)**
UNIT VI	**Models of Curriculum Design and Evaluation:** – Models of Curriculum Development: The Tayler Model, Hilda Taba's Model, and system analysis – Models of Curriculum Evaluation: Scientific models of Matfessel-Michael Evaluation, Provus's Discrepancy Evaluation model, Humanistic Model of Stake's Responsive Evaluation model, Paclett and Hamilton's Evaluation Model.	**Unit 6:** Models of Curriculum Design and Evaluation **(Pages 141-168)**

UNIT VII Curriculum Issues:

- Curriculum at National, State and Local Level; Advantages and Disadvantages.
- Preparation and Evaluation of a Text-Book.
- Core - Curriculum
- Academic time in the implementation of Curriculum

Unit 7: Curriculum Issues
(Pages 169-215)

UNIT VIII Research in Curriculum:

- Concept, Aims and Areas of Curriculum Research
- Research in Content Analysis
- Construed vist Approach

Unit 8: Research in Curriculum
(Pages 217-240)

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INTRODUCTION

NOTES

Curriculum development in historical perspective is both timeless and context dependent. As a process, curriculum development is a contribution by the curriculum field that has stretched into all aspects of university life and indeed culture generally. Curriculum development is timeless because it deals with how to take knowledge of any kind and connect it with a group of students located in time and space. As long as institutions exist for the purpose of schooling, the practice of curriculum development, in some form or another, will persist. Although meanings for curriculum development have shifted during the past 90 years, the idea that curriculum development implies the preparation and transmission of knowledge within an institution whose purpose is to educate has remained consistent.

The book *Curriculum Development has* been designed keeping in mind the self-instruction mode (SIM) format and follows a simple pattern, wherein each unit of the book begins with *Introduction* followed by *Unit Objectives* to the topic. The content is then presented in a simple and easy-to-understand manner, and is interspersed with *Check Your Progress* questions to test the understanding of the topic by the students. A list of *Questions and Exercises* is also provided at the end of each unit, and includes short-answer as well as long-answer questions. *Key Terms* and the *Summary* section is a useful tool for students and are meant for effective recapitulation of the text.

The book is divided into eight units.

Unit 1 deals with the meaning, nature and scope of curriculum and principles and concept of curriculum development.

Unit 2 talks about the philosophical, psychological, sociological and historical foundations of curriculum development.

Unit 3 is on the various processes involved in curriculum development.

Unit 4 gives a detailed account of sources and different types of curriculum design.

Unit 5 gives a detailed account on the meaning, types and tools and techniques of curriculum evaluation.

Unit 6 discusses the different models of curriculum development and evaluation.

Unit 7 describes preparation of textbook and the curriculum followed at the national, state and local level.

Unit 8 discusses the aim, role and areas of curriculum research.

UNIT 1 INTRODUCTION TO CURRICULUM DEVELOPMENT

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1.0 INTRODUCTION

India, even today, is examination oriented. The needs of the learner, the social setup and the 21st century skills have never had any precedence in deciding on the learning scenario at the school level. Schools and educational institutions are very often reduced to institutes of boredom.

If one were to study the policy documents, the emphasis on a curriculum that addresses equality stands out. Yet, it has never been translated into practice. Curriculum needs to be defined and it is necessary to understand the implications of the curriculum on the syllabus to be transacted in the classroom. Again this has its implications on the

setting and maintaining of standards in education. This unit attempts to throw some light on those concepts and determinants of the curriculum that need attention.

1.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Define curriculum
- Discuss the principles of curriculum construction
- Explain the importance of curriculum development
- Describe the components of curriculum
- Examine Tyler's and types four basic principles

1.2 MEANING, NATURE AND SCOPE OF CURRICULUM

The term curriculum has been derived from a Latin word '*Currere*' which signifies a 'Race Course' or a runway on which one runs to attain a goal. Hence, from the above said meaning we can conclude that a curriculum is the instructional and the educative programme, following which the students can achieve their goals, principles and aspirations of life. It is curriculum through which the general aims of school education obtain their tangible expression. Thus, all the other resources that are available in an educational institution for say the buildings, instructional materials like books, online resources, various educational equipments are all meant for effective implementation of the single outcome i.e., curriculum.

Aristotle had commented on curriculum, 'As things are ... mankind is by no means agreed about the things to be taught.... Again about the means, there is no agreement.'

This confusion and disagreement persists till date. We are still confused about what is to be included in the curriculum, how it has to be organized, sequenced and delivered. Apart from all the existing confusion we can, in broad terms, say that curriculum stands for the following:

- Course of study and other related material in written form for school
- The subject content that has to be taught to the students
- Course being offered in an institution
- The totality of planned learning experienced that a school offers to the students

According to Oliva (1997), the following are some definitions of curriculum:

Curriculum is:

- That which is taught in schools
- A set of subjects
- Content
- A programme of studies
- A set of materials
- A sequence of courses
- A set of performance objectives

- A course of study
- Everything that goes on within the school, including extra-class activities, guidance and interpersonal relationships
- Everything that is planned by school personnel
- A series of experiences undergone by learners in a school
- What an individual learner experiences as a result of schooling.

The curriculum could be used to mean a list of topics included for a subject at a particular level, and it could be something that encompasses 'the total experiences provided to the children and as well as out of school' (*Digantar*, Activity-Based Teaching in Kerala and its Achievements: A study of pedagogical interventions in DPEP, 2002). This idea has also been supported by John Bobbitt. John Franklin Bobbitt said that curriculum, as an idea, had its roots in the Latin word for *race-course*. He explained the curriculum as the course of deeds and experiences through which children become the adults so that they should be *successful in the adult society*. Furthermore, the curriculum encompasses the entire scope of formative deed and experience occurring in and out of school, and not only experiences occurring in school; experiences that are unplanned and undirected, and experiences intentionally directed for the purposeful formation of adult members of society. Bobbit spoke of the curriculum being part of social engineering.

Social engineering in curriculum

A curriculum is prescriptive, and is based on a more general syllabus which merely specifies what topics must be understood and to what level to achieve a particular grade or standard.

'Unfortunately,' writes Christopher Winch, 'discussion of what ought to be taught is sometimes made opaque by an either too wide or too narrow definition of what constitutes the curriculum.' Therefore, for instance, we have heard it said by a Government appointed Inspector of Education that the curriculum is 'everything that goes on in school' which would make the colour the school walls are painted a question of curriculum choice and bullying a part of curriculum content. Conversely, a definition such as a 'planned, sustained and regular learning, which is taken seriously, which has a distinct and structured content and which proceeds via some kind of stages of learning' (Wilson 1977) would make some activities, which children engage in at school but which, arguably, are not taken seriously, e.g. woodwork, not part of the curriculum. The means to interpreting the question of curriculum choice is to envisage the relationship between the curriculum and the objectives of education. *The curriculum is the plan for the implementation of educational aims.*

How is curriculum related to the aims of education?

The Curriculum Committee in 1975, in India, tried to define the curriculum as 'the sum total of all the deliberately planned set of educational experiences provided to the child by the school.' As such, it is concerned with

- the general aims of education at a specific stage or class
- subject-wise instructional objects and subject matter
- courses of studies and time allotment
- teaching–learning experiences
- instructional aids and materials
- the evaluation of learning outcomes and feedback to pupils, teachers and parents

When we claim that the curriculum is the sum total of the experiences provided, it implies many significant aspects. The committee seems to identify curriculum and syllabus as one and the same. If one is to study the definition of curriculum in greater depth, it is not just a course of study; it is more a basis for a course of study than the course itself. A true curriculum must allow choices and these choices must be alternatives in the real sense. So a better definition of the curriculum would be the following:

As per Winch, 'Curriculum is, perhaps, best thought of as that set of planned activities which are designed to implement a particular educational aim – set of such aims – in terms of the content of what is to be taught and the knowledge, skills and attitudes, which are to be deliberately fostered.'

Broadly defined, a curriculum is a plan for facilitating learning. This plan should ideally start from where the child is, list the different dimensions of learning that are important and which educational aims it would satisfy. Stage specific objectives have to be defined, content has to be specified and teaching and evaluation methods should be clarified.

Curriculum means two things: (i) the range of courses from which students choose what subject matters to study, and (ii) a specific learning programme. In the latter case, the curriculum collectively describes the teaching, learning and assessment materials available for a given course of study.

If we examine the definition of the curriculum further, the following points emerge:

- Learning is planned and guided. This implies planning in advance what the student is going to learn and how we are going to achieve it.
- The definition refers to schooling. We are looking at what goes on inside and outside the school.

1.2.1 Meaning and Nature of Curriculum

Curriculum can be envisaged from different perspectives. What societies envisage as important teaching and learning constitutes the "intended" curriculum. Since it is usually presented in official documents, it may be also called the "written" and/or "official" curriculum. However, at classroom level this intended curriculum may be altered through a range of complex classroom interactions, and what is actually delivered can be considered the "implemented" curriculum. What learners really learn (i.e., what can be assessed and can be demonstrated as learning outcomes/learner competencies) constitutes the "achieved" or "learned" curriculum. In addition, curriculum theory points to a "hidden" curriculum (i.e. the unintended development of personal values and beliefs of learners, teachers and communities; unexpected impact of a curriculum; unforeseen aspects of a learning process). Those who develop the intended curriculum should have all these different dimensions of the curriculum in view. While the "written" curriculum does not exhaust the meaning of curriculum, it is important because it represents the vision of the society. The "written" curriculum should therefore be expressed in comprehensive and user-friendly documents, such as curriculum frameworks; subject curricula/syllabi, and in relevant and helpful learning materials, such as textbooks; teacher guides; assessment guides.

In some cases, people see the curriculum entirely in terms of the subjects that are taught, and as set out within the set of textbooks, and forget the wider goals of competencies and personal development. This is why a curriculum framework is important. It sets the subjects within this wider context, and shows how learning experiences within the subjects need to contribute to the attainment of the wider goals.

All these documents and the issues they refer to form a "curriculum system". Given their guiding function for education agents and stakeholders, clear, inspired and motivational curriculum documents and materials play an important role in ensuring education quality. The involvement of stakeholders (including and especially teachers), in the development of the written curriculum is of paramount importance for ensuring ownership and sustainability of curriculum processes.

The nature of curriculum includes the following:

- Curriculum is something determined by experts and authorities.
- There is no right curriculum.
- Curriculum should reflect the real world, be practical, of use.
- There are many curricula we can learn and negotiate

Source: http://www.unesco.org/new/en/education/themes/strengthening-education-systems/quality-framework/technical-notes/different-meaning-of-curriculum/

1.2.2 Scope of Curriculum

The issue of scope and sequence in a curriculum requires utmost attention. Therefore, teachers, supervisors and principals need to consider the problems pertaining to the scope and sequence do curriculum carefully. The scope of the curriculum refers to the breadth of content that is taught in various units of study in the curriculum. In order to understand the requirement of breadth of content in a curriculum, we shall use the example of social studies. Social studies is a vast subject and it includes the following social sciences in its discipline:

(i) **Geography:** This can be defined as a science which deals with the description, distribution, and interaction of the diverse physical, biological, and cultural features of the earth's surface.

(ii) **History:** This involves the study of past events with respect to human affairs.

(iii) **Political science:** The branch of knowledge that deals with state and the systems of government.

(iv) **Economics:** A social science that studies how individuals, governments, firms and nations make choices on allocating scarce resources to satisfy their unlimited wants.

(v) **Anthropology:** The study of humans, past and present, that draws and builds upon knowledge from the social sciences and life sciences, as well as the humanities.

(vi) **Sociology:** The study of human social relationships and institutions.

A number of study units can be prepared from these social science disciplines that provide the necessary content for social studies. The scope of social studies may also be understood to be consisting of the following activities related to human beings:

(i) Ensuring that the recreational needs of human beings are fulfilled

(ii) Making available the required goods and services

(iii) Meeting the religious and spiritual needs of individuals to a certain extent
(iv) Creating laws to regulate the government at all levels, i.e., local, state, national and international
(v) Ensuring that the educational needs of humans are met
(vi) Transportation of people, materials and objects
(vii) Communication via technology as well as face-to-face
(viii) Fulfilling health requirements of individuals
(ix) Receiving recognition, status, and security in life
(x) Respecting institutions in society such as the home and family
(xi) Determining a suitable vocation in life

Human activities or endeavours provide sufficient material for diverse units of study in the social studies. For instance, while ensuring that the recreational needs of humans are fulfilled, the teacher may suggest a unit on Hobbies and their relevance as a topic for teaching-learning situations. The teacher may also ask the students regarding their various hobbies and interest. The scope of social studies curriculum is also related to the interests and requirements of students. The interests and requirements of students may be determined in the following way:

(i) Prior to teaching, taking the viewpoint of students as to how they wish to go about the lesson.
(ii) Asking the students to determine the problem areas that need to be covered within a particular unit of study.
(iii) Attentively listening to student s' interactions to gauge their interests which would help to evaluate their learning experiences.
(iv) With the cooperation of students and teacher leadership, learning centres can be established where it would be determine what the students will learn.

The scope of elementary school social studies may also be determined in the following ways:

(i) Social studies authors and writers also determine the scope of social studies curriculum. The writers of social studies textbooks stress on selected facts, concepts and generalizations that the students are required to achieve. Extra learning experiences are selected by the teachers that are closely related to the topics given in the unit. This enables students to develop understanding at a higher level.
(ii) Although not directly involved, programmers also aid in determining the scope of the social studies curriculum. The content available in the programmed learning aims at selected ideas that the students need to achieve. Programmers determine what students need to learn. The sequence of these learnings would also be decided by writers of programmed materials.

1.2.3 Definitions of Curriculum

Prescriptive Definitions of Curriculum

John Dewey (1902): Curriculum is a continuous reconstruction, moving from the child's present experience out into that represented by the organized bodies of truth that we call studies . . . the various studies . . . are themselves experience—they are that of the race.

Franklin Bobbitt (1918): Curriculum is the entire range of experiences, both directed and undirected, concerned in unfolding the abilities of the individual.

Harold O. Rugg (1927): [The curriculum is] a succession of experiences and enterprises having a maximum lifelikeness for the learner . . . giving the learner that development most helpful in meeting and controlling life situations.

Hollis Caswell in Caswell & Campbell (1935): The curriculum is composed of all the experiences children have under the guidance of teachers. . . . Thus, curriculum considered as a field of study represents no strictly limited body of content, but rather a process or procedure.

Ralph Tyler (1957): [The curriculum is] all the learning experiences planned and directed by the school to attain its educational goals.

Robert Gagne (1967): Curriculum is a sequence of content units arranged in such a way that the learning of each unit may be accomplished as a single act, provided the capabilities described by specified prior units (in the sequence) have already been mastered by the learner.

James Popham and Eva Baker (1970): [Curriculum is] all planned learning outcomes for which the school is responsible. . . . Curriculum refers to the desired consequences of instruction.

J. L. McBrien & R. Brandt (1997): [Curriculum] refers to a written plan outlining what students will be taught (a course of study). Curriculum may refer to all the courses offered at a given school, or all the courses offered at a school in a particular area of study.

Descriptive Definitions of Curriculum

Hollis Caswell & Doak Campbell (1935): All the experiences children have under the guidance of teachers.

Thomas Hopkins (1941): Those learnings each child selects, accepts, and incorporates into himself to act with, on, and upon, in subsequent experiences.

W. B. Ragan (1960): All experiences of the child for which the school accepts responsibility.

Glen Hass (1987): The set of actual experiences and perceptions of the experiences that each individual learner has of his or her program of education.

Daniel Tanner & Laurel Tanner (1995): The reconstruction of knowledge and experience that enables the learner to grow in exercising intelligent control of subsequent knowledge and experience.

D. F. Brown (2006): All student school experiences relating to the improvement of skills and strategies in thinking critically and creatively, solving problems, working collaboratively with others, communicating well, writing more effectively, reading more analytically, and conducting research to solve problems.

E. Silva (2009): An emphasis on what students can do with knowledge, rather than what units of knowledge they have, is the essence of 21st-century skills.

NOTES

1.2.4 Oliva's Definition of Curriculum: What is this Phenomenon Called Curriculum?

It is a general notion that the broad field of curriculum studies has not been aptly defined. According to Barrow and Carl, further confusion arises from the fact the term 'curriculum' has so many interpretations. This has resulted in numerous approaches to curriculum development and Walters has described it as a field strewn with thorns. Numerous attempts to define 'curriculum' have led to this ambiguity, as the attempts made to understand the field from descriptions of the concept. The description of the concept quite often mirrors the approaches of the relevant writers. Curriculum studies can be defined as a concentration within curriculum and instruction concerned with understanding curricula as an active force of human educational experience.

Curriculum studies specifically revolve around the following questions:

- What should be taught in school?
- Why should it be taught?
- To whom should it be taught?
- What does it mean to be an education person?

Peter F. Oliva states that in order for curriculum studies to qualify as a field of study or discipline, there needs to be a clear set of theoretical constructs or principles directing it. Curriculum studies have this strong theoretical constructs and principles directing it which also serve as guidelines. The concept 'curriculum' is, in itself, a construct. Oliva (1988) states that 'consecutive ordering of courses,' career education and behaviour goals' and 'systematic approach' are typical examples of constructs which are locked up in curriculum principles.

Another requirement put forward by Oliva for curriculum to qualify as a field of study is a vast pool of knowledge and the specific applicable skills for that discipline. Curriculum studies comply with this requirement. A major amount of subject content has been acquired from different pure and already established disciplines. Figure 1.1 is an example by Oliva of disciplines which may serve as sources.

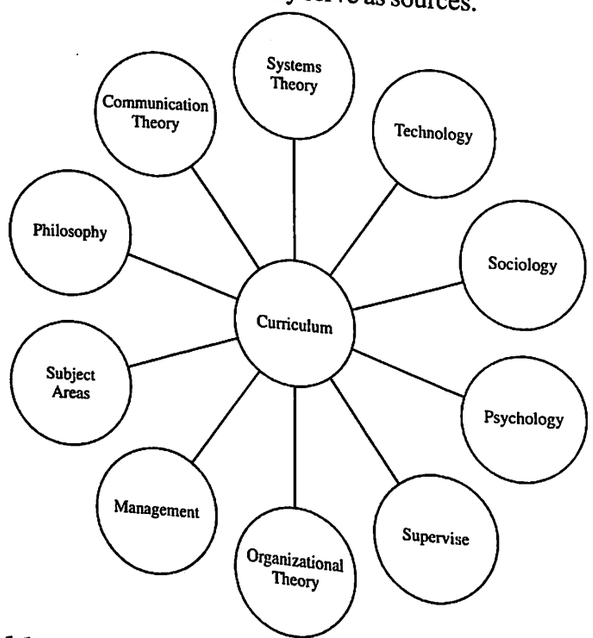


Fig. 1.1 Possible Disciplines which might act as Source (Olivia. 1988)

NOTES

Curriculum studies constantly generate its own unique contents and applicable skills. Applicable skills are not necessarily unique to curriculum studies however they may also be taken from other disciplines. Though content and skills are borrowed from other disciplines, this does not detract from the uniqueness and significance of curriculum studies as a field of study. On the contrary, it highlights the dynamics and challenges of the relevant field.

Another aspect stated by Oliva is that curriculum studies has their own theoreticians and practitioners available who develop the field by their application of knowledge and skills. This process also generates new concepts and allows room for new innovations. Broadly, curriculum studies may be defined as an inter-disciplinary field of studies where different disciplines need to work in tandem to create relevant curricula. Therefore, defining curriculum studies as being only a field of didacticians and subject didacticians is considered to be a one-sided narrow view. However, curriculum studies can also not be classified under one disciple as there are too many psychological, educational, administrative and philosophical aspects.

On reviewing Oliva's description of curriculum studies, it becomes clear that curriculum studies are a comprehensive field of study in its own right. The field of curriculum studies is so vast that it has particular contents and constructs for study purposes as well as its own role players who may be involved as theoreticians or practitioners.

According to Barrow, the field of curriculum studies originates from the field of education. Barrow suggests that 'Curriculum studies boils down to describing, explaining and justifying curriculum practice.'

Brubaker states that curriculum planners develop curricula which will not only ensure control but will also enhance understanding. However, this type of preference would influence the process of curriculum development.

1.3 BASIC FACTS RELATED TO CURRICULUM

1.3.1 Curriculum Theory and Practice

We are now going to analyse four ways of approaching curriculum theory and practice. These four ways are:

1. Curriculum as the bulk of knowledge to be conveyed
2. Curriculum as an endeavour to accomplish certain goals in students' product
3. Curriculum as a process
4. Curriculum as praxis

It is helpful to consider these ways of approaching curriculum theory and practice in the light of Aristotle's influential categorization of knowledge (Figure 1.2) into three areas: the theoretical, the productive and the practical.

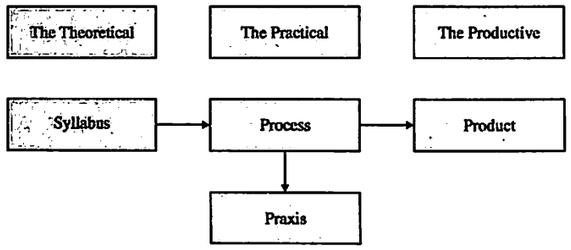


Fig. 1.2 Aristotle's Influential Categorization of Knowledge

(***Source:*** http://infed.org/mobi/wp-content/uploads/2013/04/curriculum.gif)

Here, we can identify that the amount of knowledge to be conveyed in the first is regarded as 'the canon' and the process and practical application come close to practical deliberation.

Curriculum and syllabus tend to be equated at times so we need to remind ourselves that it implies a crisp statement or table of the heads of a discussion, the subject matter of a discourse and the content of a sequence of lectures. We all are familiar with the format of the curriculum and syllabus as it is related to the courses leading to examinations.

Very often, a syllabus is equated with the textbook and the order of contents is almost suggestive of the course of study that has to be taken up. In this context, curriculum becomes the body of knowledge, syllabus, the actual content and education, the process by which the curriculum is transmitted. If we limit curriculum to syllabus, we are only focussing on content. In such cases, the curriculum is not of any importance.

1.3.2 Curriculum and Syllabus

As already discussed, there is a vast difference between curriculum and syllabus. Let us elaborate this concept further.

Curriculum as a Product

With the advent of evaluation, there is a view that curriculum is product oriented and must be seen as what it has achieved. Under this understanding of the curriculum, education is seen as a preparation for life whatever the social status of the student be. In this case, the attitudes, values, habits and knowledge that are needed for an individual after the schooling are considered most important. So the curriculum is seen as a series of experiences planned to achieve these objectives.

This is primarily the management approach to the curriculum. The criticism against this approach was that it was very technical and did not give the child any importance.

Ralph Tyler, in his book *Basic Principles of Curriculum and Instruction,* asks the following questions

1. What educational purposes should the schools seek to attain?
2. What educational experiences can be provided that are likely to attain these purposes?
3. How can these educational experiences be effectively organized?
4. How can we determine whether these purposes are being attained? (Tyler, 1949, 1)

It is important for us to realize that all objectives must eventually change behaviour. In this case, all concerns get tabulated as given below:

Step 1: Need Analysis

Step 2: Designing of objectives

Step 3: Content Selection

Step 4: Organization of subject matter

Step 5: Collection of learning experiences

Step 6: Organization of learning experiences

Step 7: Selection of what is to be evaluated and the methods of evaluation. (Taba 1962)

This approach is systematic and the objectives are very clearly defined. This implies that the content and method are defined and can be evaluated.

However, there are many issues that arise as a result of such an approach. They are as follows:

- The plan is given too much importance.
- It does not take into consideration the learning experiences.
- The learner is not given the importance he deserves.
- The specified changes are more important than anything else.
- It could de-skill the educators and educators could turn into technicians overemphasizing the delivery of the plans.
- This model overemphasises measuring everything, but everything cannot be measured.
- The concept of measuring everything tends to reduce all learning into smaller units of skills, which may also result in trivializing these skills.
- Sometimes the results achieved cannot be measured and this could mean undermining such happenings in the teaching learning process.
- It is closely related to accountability and not the wider implications of education.

1.3.3 Curriculum as a Process

In this case, the curriculum is viewed as an interaction of teachers, students and knowledge. In other words, it can be described as a vigorous exercise that consists of the happenings in the classroom. This model has the following two main components:

1. The context in which learning takes place.
2. The teacher enters the classroom with a clear, fully worked-out idea and plan as to what should happen.

Lawrence Stenhouse (1975), known to have highlighted one of the finest studies of the process of curriculum theory and practice, has defined curriculum as 'Curriculum is an attempt to communicate the essential principles and features of an educational proposal in such a form that it is open to critical scrutiny and capable of effective translation into practice.'

He compared it to a recipe. It should be viewed from the point of view of 'does it nourish the students, does it taste good and does it have what is required to make it successful and can it be varied to suit individual tastes?'

Newman and Ingram said that the following definition was taken as a starting point, 'those processes which enhance or, if they go wrong, inhibit a person's learning.' This was then developed and a curriculum became 'an organic process by which learning is offered, accepted and internalized' (Newman & Ingram 1989:1)

Curriculum, as a process, is a way of looking at the educator's work, before, during and after the interventions in order to make judgements about the directions their work is taking them.

How is curriculum a process?

As the least, a curriculum should provide the foundation for planning a course, studying it empirically and examining the grounds of its validation. It should provide for:

A. In planning

1. Standards for the selection of content, i.e., what is to be learned and taught.
2. Standards for the development of a teaching strategy—how it is to be learned and taught.
3. Standards for taking decisions about the order to be followed.
4. Standards on which to analyse the strong points and weak points of every student and segregating the general standards 1, 2 and 3 mentioned above, to meet individual cases.

B. In empirical study

1. Standards as per which the progress of students is to be analysed and evaluated.
2. Standards as per which the progress of teachers is to be analysed and evaluated.
3. Assistance as to the viability of putting the curriculum into practice in the content of various schools, students, contemporaries and milieu.
4. Information about the unevenness of effects in differing situations and on different students and an understanding of the reasons of the unevenness.

C. In relation to justification

Objectives and aims of the curriculum are to be subject to critical analysis.

So in this definition curriculum is seen as:

1. As per Stenhouse, 'a way of translating any educational idea into a hypothesis testable in practice. It invites critical testing rather than acceptance.'
2. Second, it is implied that the curriculum is not a package to be delivered anywhere; it needs to be tested and verified by each teacher in the classroom.
3. Third, the outcomes are not the determining feature. In this case, the content and models develop as teachers and students work along with each other.
4. Fourth, the learner has a place and voice in the whole process. The focus is on interactions and so there is a shift from teaching to learning.

There are some problems in this approach, which are as follows:

- It does not encourage uniformity and leads to too much variety. It is a critical model rather than a marking model.
- It cannot be pointed towards examinations. Students taught can be examined but they come as a by-product and it may be difficult to examine the weak student. Parents often give importance to the results of examination and this may come in the way.
- This model rests on the quality of the teachers. Some of them cannot function outside the safety net of a curriculum. This may limit what can happen educationally.

1.3.4 Curriculum as Praxis

The praxis model of curriculum is closely associated with the process model but it goes beyond it by making an explicit commitment to the emancipation of the human spirit.

It encourages students and teachers to look at and review through the process of critical pedagogy the problems of their existence and relationships.

Teachers take on the mantle of teaching with the motive of imparting good lessons to students so that they grow up to become sensible and successful human beings.

In this manner, teachers stimulate conversation among students out of which emerges committed action. Further, they subsequently analyse the process and interpret the results.

According to Grundy, 'In this approach, the curriculum itself develops through the dynamic interaction of action and reflection. That is, the curriculum is not simply a set of plans to be implemented, but rather is constituted through an active process in which planning, acting and evaluating are all reciprocally related and integrated into the process. At its centre is *praxis*: informed, committed action.'

How is praxis defined?

Curriculum as praxis implies:

- A practice not focused exclusively on individuals but one which looks at collective understandings and practices related to particular cultures.
- A commitment to certain values that would lead to human emancipation.
- Exploring their practices with their peers.

1.3.5 Curriculum in Context

Catherine Cornbleth (1990) views curriculum as a specific type of process. For her curriculum is what actually takes place in classrooms, that is, 'an ongoing social process comprised of the interactions of students, teachers, knowledge and milieu.'

Curriculum is contextually shaped

First, the importance of the hidden curriculum cannot be undermined; the social relationships of the school, the organization of the class and the nature of student-teacher relationships. This aspect has been defined by Dewey and other educationists as significant. According to Vic Kelly 'hidden curriculum' is one of those things which students learn, 'because of the way in which the work of the school is planned and organized but which are not in themselves overtly included in the planning or even in the consciousness of those responsible for the school arrangements.' Sometimes the hidden curriculum is seen as something that is negative. However, we need to understand that 'hidden' learning does not always have a negative connotation and can have positive effects as well. According to Cornbleth, 'In so far as they enable students to develop socially valued knowledge and skills... or to form their own peer groups and subcultures,

they may contribute to personal and collective autonomy and to possible critique and challenge of existing norms and institutions.' (Cornbleth, 1990)

Second, by understanding the milieu we understand the structural and socio-cultural process on teachers and students.

1.3.6 Curriculum as the Border Line between Formal and Informal Education

Jeff and Smith explained that the curriculum, in the context of informal education, has to be viewed in a different light. Informal education as the learning that goes on in daily life. The teacher, in the informal context, enters the teaching-learning scenario without a clear proposal of action. They have an idea of the target group and broad method. They then build up their goals and during the interaction. This is because the curriculum cannot be taken out of context and the context in this case is the school. Informal educators will have to cross the boundaries between chosen specialization and the domain of formal education. We need to remember that education is much more than just formal schooling.

Different Bodies of Curriculum

Table 1.1 will help us to differentiate once again the different bodies of curriculum, theory and practice.

Table 1.1 *Different Bodies of Curriculum, Theory and Practice*

	The liberal educators	The scientific curriculum makers	The develop-mentalists	The social meliorists
Orientation	Guardians of an ancient tradition tied to the power of reason and the finest elements of the Western cultural heritage	Human life consists in the performance of specific activities. Education that prepares for life is one that prepares definitely and adequately for these specific activities.	The natural order of development in the child was most significant and scientifically defensible basis for determining what should be taught	Schools as a major, perhaps the principal, force for social change and social justice
Curriculum	Systematic development of reasoning power and the communication of 'the canon'.	Influenced by the rise of scientific management and notions of social efficiency. Focus on setting objectives (the statement of changes to take place in the students) and the organization of schooling to meet these.	Sought a curriculum in harmony with the child's 'real' interests, needs and learning patterns.	Corruption and vice, inequalities of race and gender and the abuse of privilege and power should be addressed directly with the aim of raising a new generation equipped to deal effectively with these abuses.
Key thinkers	Charles W. Taylor	Franklin Bobbitt and Ralph W. Tyler	G. Stanley Hall	Lester Frank Ward
Linked to	Transmission	Product	Process	Praxis

(***Source:*** Kliebart 1987:l)

CHECK YOUR PROGRESS

1. How did the curriculum committee in India define curriculum?
2. What was the name of the book written by Ralph Tyler?
3. What are the main components of the curriculum as a process model?

1.4 PRINCIPLES OF CURRICULUM CONSTRUCTION

The content of curriculum is set and planned on the basis of some scholarly principles which are stated under:

1. Aims of Education and Objectivity

Complexity is the core of life and a curriculum should replicate these complexities of life. In simple way we can say that while framing the curriculum one should take into consideration the aims and objectives of education.

Child-centric principle: As current education is child-centred thus the curriculum should also be child-centred. Curriculum should be planned keeping a child's requirements, interests, abilities, capacity, age and circumstances in mind. In fact, curriculum is meant to bring about advancement and growth in children so that they are able to fine-tune their lives in the desired direction.

Principle of Development of Innate Powers: The innate power of the children must be drawn out and sharpened by the curriculum.

Principle of conservation: Man has conserved experiences very carefully for better adaptability. Education is regarded as a means of preserving the cultural heritage of humanity. The school serves two-fold functions in this regard— preservation of the past experiences and transmission of experiences.

Principle of time duration: The time for each subject allotted in the timetable reflects the appropriateness, importance and relative significance of any school programme. Thus the principle of the time is very important for an effective curriculum planning.

Principles of creativeness: Reymont has rightly said, 'In curriculum that is suited to the needs of today and of the future, there must be definitely creative subjects.' Education not only conserves the precedent experiences of civilization but also helps an individual to develop his native potentialities. Thus the culture should not be simply carried forward as it is but should also be enriched. There should be provision in the curriculum to develop the creative powers of the child.

Principles of civil and communal needs: Man is a social being and lives in a well settled society. The development of the child takes place in this society. The aim of the modern education is both the development of the individuality of children as well as the development of the society in which they live.

Principle of elasticity and variety: The curriculum shall create disinterest if it is rigid and narrowly conceived. Therefore, curriculum should be balanced by giving emphasis to all aspects like interest, abilities, variety of skills, hobbies, and habits.

Principle of forward-looking: The aim of life-centred education is not limited to the present life-situations in the family and society. Hence, education must prepare a child to shoulder future responsibilities. So in framing the curriculum we must take into consideration the future needs of the child as well as the needs of the society.

Principle of preparation for living: The children should know the various activities of the environment around them and how these activities enable people to meet their basic needs of food, shelter, clothing, recreation, health and education.

Principle of integration and correlation: The subjects that are dealt with should be arranged logically and psychologically in harmony with a child's developing interests and welfare.

Principle of learning ability: Every item that is taught or discussed should be learnt. An item should not only be learnable, it should also have utility in practical sense.

Principle of moral values: The curriculum should develop social norms and moral values to help the students to live as a successful citizen in the society.

Principle of individual difference: The curriculum should be framed in such a way that every individual can have opportunity for self-expression and development. The curriculum should be based on the psychology of individual differences to meet the complexities of modern democratic society.

Principle of social relevancy and utility: Subjects should not be determined on the basis of their disciplinary value but on the basis of their intrinsic value, social relevancy and utility.

Principle for utilization of leisure time: We are well aware of the famous proverb 'an idle man's brain is a devil's workshop' therefore curriculum should provide work for leisure time as well. Variety of subjects such as sports, gardening, fine arts, photography, and subjects of aesthetic value should be introduced in the school programme to utilize leisure time of the children.

Principle of variety and flexibility: The curriculum should include activities and experiences which may facilitate normal development of children. The curriculum for girls should naturally be different from that of boys as they have different needs and attitudes.

1.4.1 Dimensions of Curriculum Development

Several new items are being used in education and curriculum development. Some of these terms are curriculum construction, curriculum reforms, curriculum implementation, curriculum research, curriculum evaluation, and curriculum planning. All such terms refer to the development of curriculum in various ways. The development of curriculum can be studied in terms of three dimensions as suggested by Lulla. These dimensions are:

- Curriculum planning
- Curriculum implementation
- Curriculum evaluation

The dimensions of curriculum planning involve fundamental questions regarding objectives of educational institutions, as well as of specific courses, contents and learning experiences. The dimension of curriculum implementation includes decisions about syllabus outlines, curriculum guides, textbooks, and teaching aids. The third dimension, curriculum evaluation, includes decisions on supervision of instruction, guidance to educational institutions for improving their educational programmes, and methods and means of improving these programmes.

The effectiveness of curriculum development depends on the effectiveness of each of its three dimensions.

1.4.2 Process of Curriculum Development

The task of developing a curriculum is highly complex, and involves several steps. The sequence of these steps needs to be logically determined. Curriculum development is possible only on the assumption that there is an orderly sequence in approaching this task. All the decisions need to be made and carried out in a systematic order for developing the curriculum. The very nature of learning facilitates the orderly sequence of developing curriculum in education.

The following steps determine the curriculum development in education:

- Selection, formulation, and classification of objectives
- Selection and organization of learning experiences
- Evaluation of learning
- Implementation of evaluation results

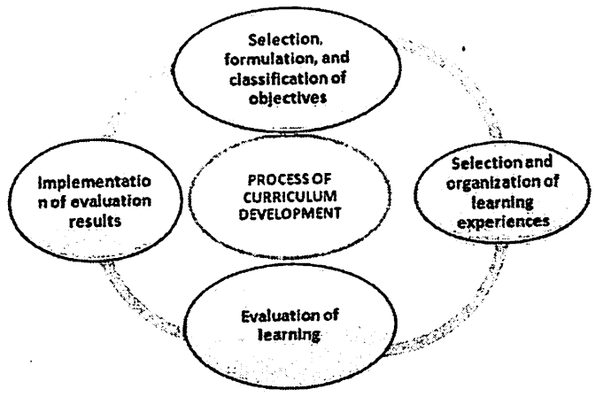


Fig. 1.3 Process of Curriculum Development

CHECK YOUR PROGRESS

4. Explain the term curriculum.
5. List any five principles on which a curriculum is based.
6. What are the various dimensions of curriculum development?

NOTES

1.5 CONCEPT OF CURRICULUM DEVELOPMENT

In developing the curriculum, we need to have appropriate mechanisms to ensure quality, conformance with common standards as well as a national democratic vision. The curriculum is actually a conceptual structure for decision-making. This structure requires the following:

- Principles on the basis of which content it is selected
- Detailed ways of working with the students
- Classroom organization
- Actual teaching learning material
- Stage specific objectives that would imply concepts, skills, values, attitudes etc., which could be organized into a body of knowledge for a particular stage of development

Figure 1.4 shows the development of the curriculum or the curriculum framework.

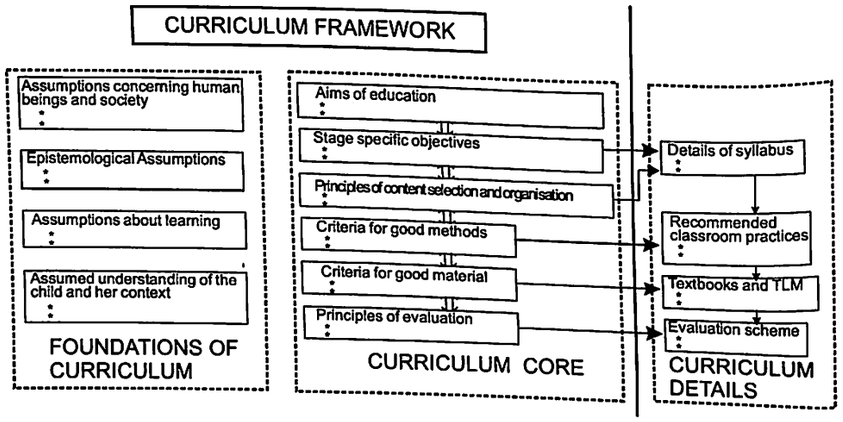


Fig. 1.4 *The Graphical Representation of Curriculum Framework*

(***Source:*** Curriculum, Syllabus and Textbooks Position paper National Focus group NCERT)

The curriculum details provide the teacher with a rationale for choosing certain practices. These practices could be related to the larger goals of education. This helps the teacher to see the connections between theory and practice. Usually, when teachers start working with students, they have some content, they have some methods and they draw up some indicators to show that learning has taken place. However, we must keep in mind that most teachers look at the textbook as the curriculum and the syllabus and feel that it has to be taught and is the only syllabus to be taught. This becomes then a mundane activity which does not contribute to the child's growth.

It needs to be understood that textbooks are tool—conventional mechanism to collect and put together information required to be learned by students. As mentioned in *Curriculum, Syllabus and Textbooks Position Paper*, National Focus Group-NCERT, the two important conditions that enable teachers to look beyond the textbooks are as follows:

(i) What the children are expected to learn

(ii) The awareness of conceptual difference between the syllabus and the textbooks

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Curriculum Determinants

Curriculum determinants include a large number of assumptions. These foundational assumptions on which a curriculum framework ought to be based must be consistent, clearly articulated and acceptable to all stakeholders. These assumptions can be put into the following four overlapping groups:

- Assumptions concerning human being and society or socio-political assumptions
- Epistemological assumptions
- Assumptions about learning
- Assumptions concerning the child and its context.

These assumptions can be further discussed as follows:

- Assumptions concerning human being and society or socio-political assumptions
- This group of assumptions is the most important one and must be agreed upon by all the stakeholders. A typical foundational statement in this area could be:
- 'Education should aim at a pluralistic democratic society based on justice, equity and freedom.' When a curriculum states an assumption related to human life and living together, it is said to be politico-ethical in nature.

Epistemological assumptions

The main fulcrum of all educational endeavours is knowledge in its widest sense. This includes understanding ways of thinking, values and skills. 'The issues of selection of knowledge to teach, their ordering, integrated versus subject-wise curricula, the information versus knowledge versus abilities debate, etc., heavily rely on the epistemological assumptions.'

Assumptions about learning

This looks at how children learn best and coined phrases like 'child-centred learning,' 'activity based learning' and 'joyful learning' on which classroom practices are based. It is accepted as part of the curriculum.

Assumptions concerning the child and its context

The main significance of this assumption lies in bringing the immediate socio-cultural aspect and the psychology of learning on one platform. This helps us to understand the terminology of 'curriculum framework,' 'curriculum,' 'syllabus,' 'textbooks' and 'teaching-learning transactions.'

CHECK YOUR PROGRESS

7. What needs to be done while developing curriculum?
8. How are curriculum details helpful for teacher?

NOTES

1.6 COMPONENTS OF CURRICULUM

Curriculum plays a vital role in an educational system. It is like a blueprint which paves the ways for the teacher and the learner to reach the desired objectives. As a result, authorities have to devise it in such a way that it could lead the teacher and the learner meets the desired learning outcomes

The four main components of curriculum are:-

- Curriculum goals, aims and objectives
- Curriculum content
- Curriculum learning experiences and transaction
- Curriculum evaluation

These four components of the curriculum are essential and are interrelated to each other. Each of these is well connected to one another.

1.6.1 Component I - Curriculum Goals, Aims and Objectives

First chief component of curriculum are its objectives. Performance indicators against which success or failure of instructional effectiveness is judged are to be identified. Such reference points are goals, aims and objectives, which represent end points of learning. A long ranged goal is to develop a wholesome personality. Aim stands for developing scholastic aspects of students. To develop in students the concept of validity and apply in setting a question paper, is an objective which is a lower level learning outcome that is a prerequisite to a higher level outcome (aim) which in turn become prerequisite to still higher level of outcome (goals).

Thus objectives represent intended learning outcomes at different levels and become the basis for organizing learning experiences and for development of evaluation tools when defined in terms of behaviours. Curriculum objectives are the foundation for any curriculum framework. It is the curriculum objectives which provide direction in the teaching learning process. They provide basis for content selection and curriculum transactions besides reflecting objective bases for evaluation system. Therefore, derivation of objectives, criteria of good objectives, their formulation and statement in terms of intended competencies, are significant steps in developing curriculum objectives.

Derivation of objectives

Approaches which are used to identify objectives are:

Empirical approaches

- *Job analysis technique*: In this technique analysis of behaviour of good workers are undertaken and significant behaviours become the basis of intended behaviours, i.e., instructional objectives.
- *Critical incidence technique*: Demands noting of critical outstanding behaviours that help learners to do a task well which then becomes the basis for intended behaviours, i.e., instructional objectives.

- *Diagnostic studies*: It demands comparison of behaviours of good and poor performers. Behaviours reflecting good performance become the basis of intended behaviours, i.e., instructional objectives.

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View of Curriculum Experts

Here we depend on three sources:

- *Needs and abilities of learners*: At a given phase what are pupils' social, physical, psychological and emotional needs; the habits, interests, attitudes they exhibit, things they must learn, etc. Thus their needs, abilities and educational potential provide basis for curriculum objectives.
- *Societal demands and pressures*: Social philosophy, socio-economic demands, resources, problems and constraints become the basis for identifying the kind of behaviours that students as citizen of tomorrow should develop become the basis for derivation of objectives.
- *Requirements of the discipline*: Every discipline has its own structure, which reflects what knowledge in teaching, learning, or examining, is decided by subject experts on the basis of which educational objectives are derived.

Criteria of good objectives

- Objectives should be meaningful, worthy, and of educational implication
- Should be in agreement with broader goals of education
- Should be comprehensive enough to include both cognitive and non-cognitive aspects of the development of students
- Conform to psychology of development
- Testable in terms of observable and verifiable changes
- Attainable under institutional conditions
- Should be acceptable and suitable to the teachers

Specification of objectives in operational terms

It demands defining them in terms of learning competencies, which reflect intended pupils' behaviours as a result of instructional interventions. For example knowledge objective is specified to reflect pupils' ability to recall, recognize, reproduce, etc.

Understanding objective reflects pupil's ability to translate, relate, compare, classify, interpret etc. Application objective defined as ability to analyse, hypothesise, reason, generalize, predict etc. as per NCERT taxonomy.

Criteria for stating objectives

- It should be stated in terms of students' performance, not teachers' performance.
- Objectives indicate intended outcomes or product of learning, not process of learning.
- They reflect pupils' terminal behaviour as well as content aspect.

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- They are stated as a proper level of generality and in a non-composite manner, i.e. one objective in one statement.
- They should be written in full statement using action words like knows, understands, and applies.
- Each objective is followed by specifications reflecting intended competencies.

Classification of objectives

Objectives can be classified in different ways. Depending upon the criterion used we can have two-way classification. For example we have:

- Cognitive vs. non-cognitive objectives (aspect of development)
- Products vs. process objectives (type of learning outcomes)
- General vs. specific objectives (generality level)
- Open vs. closed objectives (type of response desired)
- Ultimate vs. proximate objectives (time contingency)
- Stated vs. functional (operativeness)
- Tangible vs. intangible (concrete or abstract)
- Single vs. multiple course objectives (course coverage)

Taxonomies of Objectives

Taxonomic classification of objectives is based on hierarchy of objectives arranged in order of increasing complexity. There are various taxonomies under cognitive, affective and psychomotor domains.

1. Cognitive Domain Taxonomies

Some of the usable taxonomies are:

Bloom's Taxonomy: (1956) Postulates underlying this taxonomy are :

- Behaviours designated are cognitive
- Objectives are arranged in hierarchical order
- Hierarchy is cumulative in nature
- Processes designed are learned behaviours

Six objectives in hierarchical order and increasing complexity are Knowledge (K) Comprehension (C) Application (A) Analysis (AN) Synthesis (S) Evaluation (E)

Gagne's Taxonomy: It has learning hierarchy of six objectives.

Reinstating→ discriminating→ identifying→ classifying→ demonstrating→ generating

Gagne-Merrill's Taxonomy: This is based on push down principle of acquisition of lower level behaviour before the next higher level. This taxonomy integrated the cognitive, affective and psychomotor domains.

Reinstating →Signal learning →Stimulus response learning →Classifying→ Discrimination learning →Concept learning

Decorates Taxonomy: "The six objective are arranged in order of

Perception of information→ Recall and reproduction of information→ Interpretation of information→ Convergent production of information→ divergent production of information→ Evaluation product of information

Hannah and Michaelis: Data gathering, observing and recalling is the basis leading to→ interpreting → comparing → classifying →generating →inferring → analysing→ synthesizing → hypothesising → predicting complexity

NCERT Taxonomy: It is a three tier taxonomy based on Bloom's principle of cumulative hierarchy and supported by empirical evidence in India. It is the most commonly used classification of objectives in cognitive domain by all examination boards and teachers in India.

Objectives in order of increasing complexity are:

Knowledge → Understanding → Application

Each objective is specified in terms of intended learning competencies.

Affective Domain Taxonomies

Two important taxonomies are:

Krathwhol et al: Taxonomy uses internalization principle for the different levels listed in order of receiving →responding →valuing →organisation →characterisation, in terms of increasing complexity.

Hannah and Michaelis: The basis of this taxonomy is the basic processes involved in data gathering.

Responding →complying →accepting → referring →integrating

1. Psychomotor Taxonomies

Some notable taxonomies are as under:

Simpson's Taxonomy: Sequence and level of complexity in performing motor act is the basis.

Perception → guided response →mechanism →complex overt response →adapting→ originating

Alles Taxonomy: Adaptive reutilization is the basic underlying principle. Objectives are as follows:

Initiatory level → pre-routine level → routinization level of execution

Dave's Taxonomy: Basis is concept of coordination. Objectives are as follows:

Imitation → manipulation →precision →articulation → naturalization

1.6.2 Component II - Selection of Content

The content is usually considered to be the most important component for developing curriculum. It contains information to be learnt in school. It is an element or a medium through which the objectives that are set are to be accomplished.

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However this selected importance given to content is educationally mislaid and hard to defend. To put content at the centre of the curriculum is like putting the cart before the horse. The overall approach to the curriculum determines the approach to the task of selection of content. For example, in a process-based approach, only such content will be selected which supports the chosen process or processes. Even in a subject-based curriculum, one has to be clear about knowledge, principle, generalizations, theories, techniques and procedures that can be developed through the chosen content. The content is thus a powerful means for attaining the aims of teaching a particular content.

The process of selecting of content can be viewed at three levels.

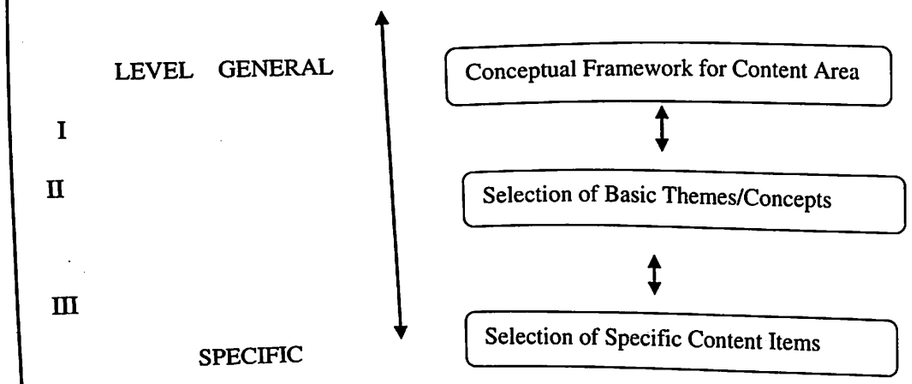


Fig. 1.5 The Process of Selection

- The first level is primarily concerned with selection and explaining framework related to the content area. The so called modern mathematics of the 1960s and the conventional mathematics provide a good example of this.
- The second level is concerned with assortment of basic themes or key concepts which along with other basic themes or concepts constitute the framework of knowledge in a given subject. Basic operations, the number system, the set theory are some of its examples. These themes/key concepts have a hierarchical relationship with each other. Some of these have broach implication (e.g. the number system) while others have limited connotation (e.g. prime numbers).
- The third level is the most precise. At this level the content items are matched with the basic theme/concept to which they belong and also with the objectives of curriculum.

In organizing the learning contents, balance, articulation, sequence, integration, and continuity form a sound content. Principles that should be followed in organizing the learning contents as advocated by Palma (1992) are:

1. **Equilibrium**: Content curriculum should be moderately spread out in depth and breadth of the particular learning or discipline. This will ensure that the level or area will not be overcrowded or less crowded.
2. **Articulation**: Each level of subject material should be well associated or related to the next, obvious gaps or careless overlaps in the subject matter should be avoided.

3. **Sequence**: This principle is related with the logical arrangement of the subject matter. It refers to the deepening and expansion of content as it is taken up in the higher levels.

The horizontal associations are needed in subject areas that are similar so that learning will be related to one another. This is known as Integration.

Continued application of the new knowledge is required in skills and attitudes or values while learning so that these will be used in day-to-day life. The regular replication, reassessment and reinforcement of learning are referred to as Continuity.

1.6.3 Component III - Curriculum Learning Experiences

For the third component, the curriculum experience, instructional strategies and methods are the core and heart of the curriculum. These instructional strategies and methods will put into action the goals and use of the content in order to produce an outcome.

Teaching strategies convert the written curriculum to instruction. Among these are time-tested methods, inquiry approaches, constructivist and other emerging strategies that complement new theories in teaching and learning. Educational activities like field trips, conducting experiments, interacting with computer programs and other experiential learning will also form part of the repertoire of teaching.

Whatever methods the teacher utilizes to implement the curriculum, there will be some guide for selection and use such as:

- Teaching methods are means to achieve the end.
- There is no single best teaching method.
- Teaching methods should stimulate the learner's desire to develop the cognitive, affective, psychomotor, social and spiritual domain of the individual.
- In the preference of teaching methods, learning styles of the students should be well thought out.
- Every method should lead to the development of the learning outcome in three domains (cognitive, affective and psychomotor).
- In use of teaching methods the flexibility element should be considered.

Learning experiences help to bring change in behaviour and it results in attainment of aims and objectives. A variety of learning experiences deal with performances of the human beings in particular situations, their interests or problem solving. These learning experiences provide physical, mental or emotional experiences or a combination of it. Teaching different subjects, a range of activities in a laboratory, on the playfield or through projects, discussion, group work, etc. are examples of educational learning experiences. One should make sure that the selected learning experiences indeed help in the attainment of a specific educational aim/objective.

The selected learning experiences should be relevant to learners in terms of their maturity level. Since there does not exist any sure way of determining whether the selected learning experiences match the learners' maturity level, there is always an element of tentativeness about them. The teacher, if she is involved in selecting learning experiences, will invariably be guided by her own experiences of dealing with observing children. She may also depend upon her recollections of how she behaved when she was of the age of the learners for whom the curriculum is being developed.

Organization and integration of Learning Experiences and Content is also required at this level. The essential task at this stage is to develop sequences of educational activities based on selected experiences and content. This fusion of selected experiences and content has a definite purpose which is derived from educational objectives. Hence it is called a *sequence of learning experiences*. The organising principles for this integration and sequence should ideally be derived from the learning situations available in schools and classrooms, inputs needed for effective classroom interaction, the developmental levels of learners, and principles of learning by children for whom the curriculum is meant.

It must be remembered that there are alternative ways of sequencing and integrating content and learning experiences. Besides, a particular approach to sequencing and integration of content shall have certain implications for classroom methodology and administration of school. A change in sequencing and integration of content and learning experiences is bound to affect classroom methodologies or school administration or both. Quite often, this sequencing and integration is determined by the size and scope of units and the overlap and interrelation among units.

1.6.4 Component IV- Evaluation

The last stage in the curriculum process is Evaluation. Curriculum evaluation refers to the formal determination of the quality, effectiveness or value of the programme, process, and product of the curriculum. It is a process of judgement based upon significant evidence. This evidence may be quantitative (e.g. marks awarded in various tests) and/or qualitative (e.g. observation –based information). Evaluation may be based on aims, goals or objectives of the curriculum. Objectives based evaluation is more specific and usually more useful for teachers. Evaluation should be treated as a micro-level concept as well as macro-level concept. At micro-level, evaluation deals with intended objectives, actually attained objectives and an analysis of the gap between these two and how it can be reduced. Such analysis is usually based on measureable objectives.

A recommended Plan of Action (POA) for the process of curriculum evaluation is introduced and the steps are:

1. To focus on one particular component of the curriculum at one time. Whether it be subject area, the grade level, the course, or the degree programme we should take consideration of it one at a time.
2. Collection of the information is required. Information is made up of data needed regarding the object of evaluation.
3. Organizing the information is very essential. This step requires coding, organizing, storing and retrieving data for interpretation.
4. An appropriate way of analyzing information is utilized.
5. Report the information. The report of evaluation should be reported to specific audiences. It can be done formally in conferences with stakeholders, or informally through round table discussion and conversations.
6. Recycling the information for constant response, feedback, modifications and adjustments to be made is essential.

1.7 TYPES OF CURRICULUM

Let us identify the types of curriculum or understand the classification of curriculum. Curriculum could be classified according to the common psychological classifications of the four theories of learning 'Social, Information Processing, Personalist and Behavioural.' Longstreet and Shane have classified curriculum types as 'child-centred, society-centred, knowledge-centred or eclectic.'

Wilson (1990) defined curriculum as 'anything and everything that teaches a lesson, planned or otherwise. Humans are born learning; thus, the learned curriculum actually encompasses a combination of all of the below — the hidden, null, written, political and societal etc. Since students learn all the time through exposure and modelled behaviours, this means that they learn important social and emotional lessons from everyone who inhabits a school—from the janitorial staff, the secretary, the cafeteria workers, their peers, as well as from the deportment, conduct and attitudes expressed and modelled by their teachers. Many educators are unaware of the strong lessons imparted to youth by these everyday contacts.'

The different types of curriculum can be discussed as follows:

1. **Overt, explicit or written curriculum**: This refers to all the written aspects of the curriculum and includes all the documents formally selected and designated by curriculum experts.
2. **Societal curriculum**: Cortes (1981) defines this curriculum as '[the] massive, ongoing, informal curriculum of family, peer groups, neighbourhoods, churches organizations, occupations, mass, media and other socializing forces that "educate" all of us throughout our lives.'
3. **The hidden or covert curriculum**: Everything that happens in the educational institution is part of this curriculum. Longstreet and Shane (1993) offer a commonly accepted definition for this term: the 'hidden curriculum,' refers to the kinds of learnings children derive from the very nature and organizational design of the public school, as well as from the behaviours and attitudes of teachers and administrators.'

   This includes everything that is part of the educational institution from the classroom arrangement to the calendar of activities.

   David P. Gardner is reported to have said, 'We learn simply by the exposure of living. Much that passes for education is not education at all but ritual. The fact is that we are being educated when we know it least.'
4. **The null curriculum:** This includes what we do not teach, implying that this is not important. Eisner (1985, 1994) first described and defined aspects of this curriculum. He states, 'There is something of a paradox involved in writing about a curriculum that does not exist. Yet, if we are concerned with the consequences of school programmes and the role of curriculum in shaping those consequences, then it seems to me that we are well advised to consider not only the explicit and implicit curricula of schools, but also what schools do not teach. It is my thesis that what schools do not teach may be as important as what they do teach. I argue this position

because ignorance is not simply a neutral void; it has important effects on the kinds of options one is able to consider, the alternatives that one can examine, and the perspectives from which one can view a situation or problems.'

Organizations like schools make conscious decisions on what is to be taught or not taught.

5. **Phantom curriculum:** This includes messages from the media through which students learn. This creates a cultural curriculum, which is acceptable to the young.
6. **Rhetorical curriculum:** This curriculum is based on ideas generated by policy makers, school administrators or politicians. This could be a result of educational initiatives at local and state or central levels. It could also be the result of updates in pedagogical knowledge.
7. **Curriculum in use:** This is the curriculum in textbooks and district curriculum guides. It is in fact the actual curriculum that is delivered and presented by the teacher in the class.
8. **Received curriculum:** This includes what the students take back with him after the class is over.
9. **The internal curriculum:** This is the curriculum that is combined with the student's existing knowledge to create new knowledge. This is unique to each student and there is very little control on it.
10. **The electronic curriculum:** This implies the learning that takes place through the use of technology resources. The information so gained could also be inaccurate so the implications for education are the training of students on processes involving critical viewing and analysis. Students must be exposed to netiquette.

1.7.1 Types of Curriculum: Inert, Official and Hidden

Inert curriculum or dead curriculum refers to unused curriculum. McNeill (2003) has defined 'dead' or inert curricula as unused and live curricula as engaging students in a meaningful classroom activities. He further explains live curriculum by stating, 'Everything in the curriculum is human knowledge-a product of human hopes, fears and passions. If we want to make that knowledge engaging to students, we have to share it in the context of the hopes, fears and passions from which it has grown and in which it finds a living meaning.'

Official curriculum, which is sometimes called formal curriculum, refers to planned programme of objectives, content, learning experiences, resources and assessment offered by a school. There is a difference between formal and informal curriculum, i.e., between the formal activities for which the school timetable provides specific periods of teaching and those informal activities that simultaneously occur on a voluntary basis at lunch time, after school hours, weekends or vacations. Activities such as sports, clubs, societies, school journeys and the like are termed as extracurricular activities and therefore should be seen separate from the curriculum itself.

It is difficult to identify the reasons as to why extracurricular activities need to be seen as separate from curriculum as activities of such nature are regarded to have more

educational validity in comparison to formal curriculum. Due to this reason in England, the Newsom Report CACE, 1963: para. 135) recommended that they 'ought to be recognized as an integral part of the total educational programme' and that to this end they be included in the formal timetable of an extended day. And the inclusion of this kind of activity in the formal provision made by the school has also been a major feature of the philosophy of many of those concerned with the development of community schools (Cooksey, 1972, 1976a, 1976b).

In terms of curriculum planning, it would be a huge mistake to remove the 'whole range of activities' planned and executed by teachers with deliberate reasons and intentions from the definition of curriculum. Therefore, in curriculum planning, there would appear no gain from leaving out any planned activity. It is for this reason that John Kerr (1968:16) defined the curriculum as 'all the learning which is planned and guided by the school, whether it is carried on in groups or individually, inside or outside the school.' This definition explains the basis for planning organized activities of the school, irrespective of the fact whether they are done in groups or individually inside or outside the school premises.

The difficulties arise in attempting to function within a definition of curriculum that is omitted from considering the unplanned effects of teacher activity as hidden and actual or received curriculum indicates.

There are more aspects to curriculum than are dreamed of in the philosophy of most teachers, and certainly of most politicians, and a definition of curriculum which confines its scope to what teachers, or politicians, actually plan will omit many of those important dimensions of Curriculum Studies. We need a definition which will embrace at least four major dimensions of educational planning and practice: the intentions, the actual experiences of the pupils resulting from the teachers' direct attempts to carry out their or the planners' intentions, and the 'hidden' learning that occurs as a by-product of the organization of the curriculum, and, indeed, of the school.

Hidden or covert curriculum includes everything that happens in the educational institution is part of curriculum. Longstreet and Shane (1993) offer a commonly accepted definition for this term: the hidden curriculum, which refers to the kinds of learnings children derive from the very nature and organizational design of the public school, as well as from the behaviours and attitudes of teachers and administrators.' This includes everything that is part of the educational institution from the classroom arrangement to the calendar of activities. David P. Gardner is reported to have said, 'We learn simply by the exposure of living. Much that passes for education is not education at all but ritual. The fact is that we are being educated when we know it least.'

Check Your Progress

10. What is one criteria of a good objective?
11. What are the different types of curriculum?
12. What is meant by the 'null' curriculum?

NOTES

1.8 TYLER'S FOUR BASIC PRINCIPLES

Tyler's *Basic Principles of Curriculum and Instruction* brings curriculum development into the picture. In his book, Tyler gives curriculum development a language that is more consistent that Bobbitt's representation. Before the publication of *Basic Principles of Curriculum and Instruction* Tyler had become well-known due to his work with the Eight Year Study. This study put to rest the discussion raging since 1900 regarding progressive education. Tyler was also the chief evaluator of this study.

Tyler's book, *Basic Principles of Curriculum and Instruction* speaks of the well-known 'Tyler Rationale' to create evaluation procedures for schools that were involved in the study. Tyler suggests that in order to develop curriculum, teachers and school administrators need to answer certain questions which are as follows:

1. What is the educational purpose that the school seeks to achieve?
2. What types of educational experiences need to be made available that would fulfill the set educational purposes?
3. How can educational experiences be effectively organized?
4. How can one decide whether these educational purposes are fulfilled?

These four questions were introduced as a series of steps to be followed to make curriculum more effective and therefore was not to be considered as a formula that was to be followed mandatory. Tyler states that these questions should not be followed in a technocratic manner as these questions were suppose to provide educators with a scientific process that was value neutral. Moreover, Tyler's method was to be used to develop curriculum in all subjects and all cities. The main objective of Tyler's method was to remove questions relating to purpose, morality and ultimate ends. With reference to his four questions, Tyler is suggesting that curriculum development aims to help schools to achieve their set goals. Tyler also concludes that there are no overreaching purposes to curriculum of education.

According to Tyler, the curriculum development process begins at the local level in terms of needs, interest and goals of the school and they community in which it exists. Once the schools finalize their purpose, the school community can outline the 'experiences' that will assist the students to achieve the school's goals. This also reflects the influence of behavioural psychology on Tyler's thinking. Tyler states that these experiences can be provided to students and these experiences can also be organized. Organization will confirm that students will experience the curriculum the way the curriculum makers want them to. At the end, Tyler suggests that the curriculum makers should analyse as to whether these experiences provide the desired effects.

In most part of the book, *Basic Principles of Curriculum and Instruction*, Tyler emphasizes on these four questions including a discussion on the different sources of experiences that curriculum makers take into account. For instance, throughout the process of curriculum development, curriculum makers need to base their decisions on the following factors:

- Knowledge of learners
- Insight of subject matter experts
- Whatever life lessons a student would experience outside school
- Psychological and philosophical background of these experiences

NOTES

Bobbitt's influence is very evident throughout Tyler's book *Basic Principles of Curriculum and Instruction.* Bobbitt's influence is especially reflective in the part where Tyler discusses the need for curriculum makers to keep the life experiences that a student may go through while determining objectives. Tyler focuses on community needs as it is essential that schools should work to serve their immediate communities by providing solutions to the existing challenges. In Tyler's words:

'I would suggest that you collect sample information of several sorts. On the one hand it might be well to draw upon our memory, your experience in a given area of life such as in your civic life, to jot down the activities that you engage in as a citizen. Also list the problems that you have encountered as a citizen. Imagine this information as being illustrative of what might be obtained from a considerable sample of adults in your community. In the light of such information, can you suggest possible objectives which are implied by these data?'

According to Tyler, future adult activities are also a significant source of curriculum objectives. Initially, Bobbitt began the task-analysis approach to curriculum work and Tyler held onto it while simultaneously making the effort to clarify the practice of curriculum development.

It is difficult to state the factors as to why Tyler's book *Basic Principles of Curriculum and Instruction* was so successful. Tyler understood his surroundings well and therefore was able to connect with the powerful changes taking place in the American society and culture. During the 1930-60s, Tyler was at the height of his career. In the 1910s and 20s, the existing industrialism had given way to the Cold War. The following years (1940-50s) a new kind of science originated which was specifically more intellectual that industrial. Unlike Bobbitt, who had discussed efficiency with respect to industrial productivity, Tyler has the opportunity to speak about the effectiveness and problem-solving without specific economic or political ends. While formulating the method, Tyler ensured that he followed the principle of parsimony and that he was careful to avoid connecting his ideas to any historical or social context. Tyler mainly designed a system that would assist individual schools and school districts. However, the system set forth by Tyler is designed to remain firmly above the fray. Unlike Bobbitt, Tyler successfully presented the curriculum field with a way of thinking and speaking that rises above historical context. According to Null (1999), the shortcomings in Bobbitt's method can be seen in the radical transformation that his ideas underwent during the 1940s. Tyler's idea never went through a similar transformation.

Basic Principles of Curriculum and Instruction was published in 1949 and during this phase the expansion of curriculum development was underway. Tyler's book was mainly used at the K-12 and the higher education levels. Also, institutions that served diverse purposes availed the facts mentioned in *Basic Principles of Curriculum and Instruction.* Subject matter experts from various fields adopted Tyler's process as Tyler had succeeded in giving curriculum makers a process that considerably enhanced their status.

In order to understand the positive aspects of Tyler's process, one must also acknowledge its shortcomings. Tyler's success came with a price but this could only be realized 20 years from when *Basic Principles of Curriculum and Instruction* was published. However, in the meantime other curricularists seized the opportunity to build

upon what Tyler had done. One such group was the trio of B. Othaniel Smith, William O. Stanley and J. Harlan Shores (1950). With their *Fundamentals of Curriculum Development* (B. Smith et al., 1950), the curriculum field, for the first time, is provided with an extensive treatment of the specific task of curriculum development.

Check Your Progress

13. List the factors on which curriculum makers need to base their decisions?
14. Where is Bobbitt's influence evident in Tyler's work?

1.9 SUMMARY

- The term curriculum has been derived from a Latin word '*Currere*' which signifies a 'Race Course' or a runway on which one runs to attain a goal. Hence, from the above said meaning we can conclude that a curriculum is the instructional and the educative programme, following which the students can achieve their goals, principles and aspirations of life.
- Curriculum stands for the following:
  - o Course of study and other related material in written form for school
  - o The subject content that has to be taught to the students
  - o Course being offered in an institution
  - o The totality of planned learning experienced that a school offers to the students
- Curriculum could be used to mean a list of topics included for a subject at a particular level, and it could be something that encompasses 'the total experiences provided to the children an as well as out of school'.
- John Franklin Bobbitt said that the curriculum as the course of deeds and experiences through which children become the adults so that they should be *successful in the adult society*.
- The Curriculum Committee in 1975 in India tried to define the curriculum as 'the sum total of all the deliberately planned set of educational experiences provided to the child by the school.'
- Broadly defined, a curriculum is a plan for facilitating learning. This plan should ideally start from where the child is, list the different dimensions of learning that are important and which educational aims it would satisfy.
- Curriculum means two things: (i) the range of courses from which students choose what subject matters to study, and (ii) a specific learning programme. In the latter case, the curriculum collectively describes the teaching, learning and assessment materials available for a given course of study.
- Four ways to analyse approaching curriculum theory and practice are:
  1. Curriculum as the bulk of knowledge to be conveyed.
  2. Curriculum as an endeavour to accomplish certain goals in students' product.
  3. Curriculum as a process.
  4. Curriculum as praxis.
- With the advent of evaluation, there is a view that curriculum is product oriented and must be seen as what it has achieved. Under this understanding of the curriculum, education is seen as a preparation for life whatever the social status of the student be.
- The praxis model of curriculum is closely associated with the process model but it goes beyond it by making an explicit commitment to the emancipation of the human spirit.
- Teachers take on the mantle of teaching with the motive of imparting good lessons to students so that they grow up to become sensible and successful human beings.
- While framing the curriculum one should take into consideration the aims and objectives of education.
- Several new items are being used in education and curriculum development. Some of these terms are curriculum construction, curriculum reforms, curriculum implementation, curriculum research, curriculum evaluation, and curriculum planning.
- Curriculum development is possible only on the assumption that there is an orderly sequence in approaching this task. All the decisions need to be made and carried out in a systematic order for developing the curriculum.

1.10 KEY TERMS

- **Curriculum:** It is a planned, sustained and regular learning, which is taken seriously, which has a distinct and structured content and which proceeds via some kind of stages of learning.
- **Syllabus:** It is the actual content and education, included in the curriculum.
- **Praxis model of curriculum:** It encourages students and teachers to look at and review through the process of critical pedagogy the problems of their existence and relationships.
- **Hidden curriculum**: It is those things which students learn, 'because of the way in which the work of the school is planned and organized but which are not in themselves overtly included in the planning or even in the consciousness of those responsible for the school arrangements.'
- **Curriculum determinants:** These are the assumptions on which a curriculum framework is based.

1.11 ANSWERS TO 'CHECK YOUR PROGRESS'

1. The Curriculum Committee in 1975 in India tried to define the curriculum as 'the sum total of all the deliberately planned set of educational experiences provided to the child by the school.'

2. Ralph Tyler wrote the book named: *Basic Principles of Curriculum and Instructions.*
3. The curriculum as a process model has the following two main components:
   - The context in which learning takes place.
   - The teacher enters the classroom with a clear, fully worked-out idea and plan as to what should happen.
4. The term curriculum has been derived from a Latin word '*Currere*' which signifies a 'Race Course' or a runway on which one runs to attain a goal. Therefore a curriculum is the instructional and the educative programme, following which the students can achieve their goals, principles and aspirations of life. It is curriculum through which the general aims of a school education obtain their tangible expression.
5. The five principles among others are
   - Child-centric principle
   - Principle of Development of Innate Powers
   - Principle of time duration
   - Principles of creativeness
   - Principles of civil and communal needs
6. The different dimensions of curriculum development are as follows:
   - Curriculum planning
   - Curriculum implementation
   - Curriculum evaluation
7. In developing the curriculum, we need to have appropriate mechanisms to ensure quality, conformance with common standards as well as a national democratic vision.
8. The curriculum details provide the teacher with a rationale for choosing certain practices. These practices could be related to the larger goals of education.
9. The four main components of curriculum are:
   - Curriculum goals, aims and objectives
   - Curriculum content
   - Curriculum learning experiences and transaction
   - Curriculum evaluation
10. The criteria of good objectives are:
    - Objectives should be meaningful, worthy, and of educational implication
    - Should be in agreement with broader goals of education
    - Should be comprehensive enough to include both cognitive and non-cognitive aspects of the development of students
    - Conform to psychology of development
    - Testable in terms of observable and verifiable changes
    - Attainable under institutional conditions
    - Should be acceptable and suitable to the teachers
11. The different types of curriculum are Overt explicit or written curriculum, Societal curriculum, Hidden or covert curriculum, Null curriculum, Phantom curriculum, Rhetorical curriculum, Curriculum in use, Received curriculum, Internal curriculum, and the Electronic curriculum.

12. Null curriculum includes what we do not teach, implying that this is not important.
13. Throughout the process of curriculum development, curriculum makers need to base their decisions on the following factors:
    - Knowledge of learners
    - Insight of subject matter experts
    - Whatever life lessons a student would experience outside school
    - Psychological and philosophical background of these experiences
14. Bobbitt's influence is very evident throughout Tyler's book *Basic Principles of Curriculum and Instruction.* Bobbitt's influence is especially reflective in the part where Tyler discusses the need for curriculum makers to keep the life experiences that a student may go through while determining objectives. Tyler focuses on community needs as it is essential that schools should work to serve their immediate communities by providing solutions to the existing challenges.

1.12 QUESTIONS AND EXERCISES

Short-Answer Questions

1. How does John Bobbitt define curriculum?
2. What do you understand by hidden curriculum.
3. Write a short note on components of curriculum.
4. Write short notes on the following:
   - Curriculum as a process
   - Curriculum as praxis
   - Curriculum in context

Long-Answer Questions

1. Enumerate the three levels for selection of content
2. What is the importance of evaluation in curriculum?
3. Write short notes on:
   (a) Criteria of good objectives
   (b) Criteria for stating objectives
   (c) Classification of objectives
4. Select any five curriculum types that appeal to you and write about them.

1.13 FURTHER READING

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UNIT 2 FOUNDATIONS OF CURRICULUM DEVELOPMENT

Structure

2.0 Introduction
2.1 Unit Objectives
2.2 Philosophical Foundation
  2.2.1 Suggestions to Curriculum Framers and Teachers
2.3 Psychological Foundation
2.4 Sociological Foundation
  2.4.1 Use of Technology in Curriculum Development
  2.4.2 Modernization and Innovation of Curriculum Development
2.5 Historical Foundation
  2.5.1 John Locke and the Curriculum (1632-1704)
  2.5.2 Johann Friedrich Pestalozzi and the Curriculum (1746-1827)
  2.5.3 Johann Friedrich Herbart and Sequence in Learning (1776-1841)
  2.5.4 Friedrich William Froebel (1782-1852)
  2.5.5 Kierkegaard and the Curriculum ((1813-1855)
  2.5.6 Charles Sander Pierce and Experimentalism (1893-1914)
  2.5.7 Post-Independence Efforts in the Field of Curriculum Development
2.6 Summary
2.7 Key Terms
2.8 Answers to 'Check Your Progress'
2.9 Questions and Exercises
2.10 Further Reading

2.0 INTRODUCTION

You have now understood the concept of curriculum. Similarly, with your understanding of educational sociology, psychology, and philosophy, you might be able to recollect the few aspects or considerations that have to be taken into account while structuring a curriculum like levels of education, mental set of students, teaching strategies, socio-cultural factors among others. A curriculum must provide opportunities and suitable situations for healthy social, emotional, physical and intellectual development. The planners of curriculum should be very careful in these considerations. This unit deals with different foundations of curriculum.

Philosophy explains the nature of knowledge, methods of teaching, role of the teacher, type of discipline, content of study, etc. The study of philosophy will help in the selection of teaching and learning activities, content area, method of content delivery and others. Similarly, the knowledge of psychological bases is essential like characteristics of learners, behavioural problems, different learning theories, and parameters of teacher-learner relationship. In addition to these, there are certain socio-cultural factors that affect the learning process. Also we have to make the curriculum in a scientific manner incorporating the suitable technological support to teaching and learning.

In this unit, you are going to learn about the foundations of curriculum. The topics are dealt under various sub heads namely, Philosophical Foundation, Psychological Foundation, Social and Cultural Foundation, and Historical Foundation.

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2.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Explain the bases of curriculum
- Discuss the foundations of curriculum that has to be taken care of while developing the subject matter
- Elaborate the philosophical aspects that have to be taken into account while making a curriculum
- Explain the psychological theories and postulates behind the best curriculum
- Explain the historical foundation of curriculum
- Describe the technological considerations and the importance of technology while developing a curriculum

2.2 PHILOSOPHICAL FOUNDATION

Curriculum is a totality of what is happening in and out of the classrooms, what are the causes, what will be the outcome and so on. While designing or structuring the curriculum we should keep in mind certain considerations that are discussed subsequently in this unit.

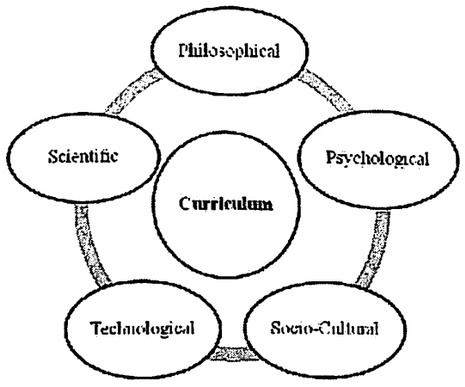


Fig. 2.1 Foundations of Curriculum

Philosophical Foundation

Let us discuss in detail the role of philosophy in curriculum, i.e., philosophical foundations of curriculum. You may be thinking now of various questions like-

- What is meant by philosophy?
- What are the different forms of philosophies?
- How does philosophy relate to education and especially the structure of curriculum?

Based on these initial questions let us start understanding the philosophical foundation of curriculum.

(a) Philosophy

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Despite an increased knowledge base, growing understanding of human development, sophistication in the use of technology and an emerging focus on teaching and learning, curriculum remains primitive and traditional. The theoretical dimension of curriculum in India has progressed to a better level; National Curriculum Framework- 2005 is the best exemplary evidence to mention. Instead of assuming that the subjects taught is taught and incorporated in the curriculum for a reason, the premise should be included in the curriculum unless it can be justified in terms of future and utility. Philosophy, psychology and sociology have a decisive role here in helping and supporting teachers.

The philosophy of education offers some practical purpose to the teachers. Its most significant role is to help teachers to think more clearly and accurately about different matters and aspects of education. Educational philosophy by its emphasis on accuracy and clarity is valuable in establishing what the real meaning is. Clarification of ideas about the related aspects is one of the major steps towards more effective curriculum planning. Philosophy helps to have clarity for planners of curriculum. Similarly, educational philosophers have given much thought to the aims of education; their writings in this area will give guidance to the developers of curriculum in framing the aims of education. Let us have a look into the basics of philosophy. What it is? And what does it incorporate?

Philosophy is the contemplative side of life and is the science of knowledge. It understands man in relation to the universe. According to Dr S. Radhakrishnan, 'Philosophy is a logical enquiry into the nature of reality.'

Philosophy thus deals with:

- the nature of reality
- the nature of man
- the goal of life, and
- the fundamental beliefs and values of life

We know that education is dealing with how to prepare for life and it aims at making man fit for different life situations. Education is the strongest instrument for the achievement of the ideals of life and civilized attempt to bring about the balanced and proper development of human personality in a systematic way considering the day-to-day experiences. Thus, it is clear that education and philosophy are closely related.

- Philosophy paves the way for education and destination. It provides guidance in deciding the goals and ideals, methods, practices, etc.
- Education is the means to achieve the goals that philosophy has made.
- As philosophy deals with the theoretical side of education, education is the practical side of philosophy.
- Philosophy establishes different aspects of education including aims of education, content, way of curriculum transaction, methods of teaching, role of the teacher, type of evaluation, form of discipline, etc.

It is philosophy which decides why a subject or a specific topic should be included in the curriculum. It also explains how the subject is to be transacted. Let us discuss different philosophies of education to have an understanding on the philosophical foundations of curriculum.

(b) Various Philosophies and Education: Linkage

Now we are going to understand various philosophies with a major focus on education. As education becomes increasingly more important vis-a-vis the technological revolution and the intra generational disjuncture that we have all come to know, educational philosophy grows in importance as well. Each of the philosophy offers a different way of viewing the spectrum of philosophical positions and values about education.

Why should we have a particular activity in curriculum? How that activity is of value to the curriculum? How will it benefit the learner? What activities and experiences are required to carry out the desired goals and specific objectives determined? How do we teach? What are the strategies and methods to be adopted for the fulfillment of the specific objectives? All these queries should be well addressed while making any suitable curriculum. Definitely the study of philosophy helps in the finalization of all these aspects. Moreover, specialists in the philosophy of education have made significant contributions to clarifying the relationship between the nature of knowledge and curriculum development.

Idealism, naturalism, pragmatism and realism are considered as major philosophies. Let us have a detailed discussion about theses philosophies. For clarity we are going to discuss in a pattern namely, meaning of the philosophy, basic postulates, aims of education, curriculum methods of teaching and the role of the teacher.

1. **Idealism:** It seeks to offer an explanation of man and the universe in terms of spirit. Therefore, idealism believes in supernatural powers. It believes in spiritual nature of man. Ideas are believed as unchanging. According to idealist philosophy, education should help in realizing the spiritual nature of the child. Idealists want that curriculum should be a reflection of human culture and civilization. The main proponents of idealism are Socrates, Plato, Kant, Hegel, Froebel, Vivekananda, Gandhi, Radhakrishnan among others. The basic tenets of idealism are-
   - Priority to mind and self of the individual
   - All of the universe exists in spirit
   - Man is a superior creature and is distinctive in nature
   - Faith in eternal and spiritual values
   - It emphasizes normative and social sciences
   - It believes in universal education

   As per idealistic ideals the aims of education are-
   - attaining self-realization
   - the making of actual or real
   - achieving the highest potentiality of the self
   - preservation and enrichment of the cultural environment
   - development of moral sense, development of inventive and creative powers

   To achieve these goals there should be in-depth knowledge about the cultural heritage, maturity in thinking, reasoning, and higher order capacities like problem solving and reasoning. The curricular areas of idealistic philosophy consist of the following:

   - Intellectual activities: Literature, science, mathematics, history, geography, languages, etc.
   - Aesthetic activities: Art and poetry to reinforce moral impulse
   - Moral activities: Religion, ethics and metaphysics
   - Physical activities: Health and physical education, sports activities, handicrafts and skills

   Idealism emphasizes question answer method, lecture method, storytelling, inductive and deductive methods of teaching. Teacher has got a high position in idealism. As per idealistic philosophy teacher should be morally high, intellectually developed and culturally advanced.
2. **Naturalism:** Naturalism is a type of philosophy which considers nature as the whole of reality. It approaches philosophy from a pure scientific point of view. Rousseau, Locke, Pestalozzi, Tagore, Nunn among others are the major advocates of naturalistic philosophy. It puts forward that education should focus on the nature of child. Nature of child is dynamic. The purpose, process, and means of education should be within the experiences of the child. The basic educational philosophical ideas of naturalists are given below.
   - Nature is the base of all education
   - Education should be child-centered
   - Advocates for the maximum freedom to child
   - Instincts of the child constitute the basis of all education
   - Senses are the gateways of all knowledge

   Naturalism assigns the following as the major aims of education.
   - Self-expression or self-preservation
   - Perfection of man
   - Transformation and modification of instincts
   - Help in struggle for survival
   - To have better adjustment
   - To achieve individuality and social progress

   The subjects included in the curriculum thus should be in accordance with the interests and needs, and natural environment of the children (students). Naturalistic curriculum gives importance to the sciences. Present experiences, activities, and interests of the child should be taken care of in the curriculum. They considered mathematics and languages as tools for understanding sciences. The other subjects suggested by naturalists are history, social sciences, agriculture, carpentry, drawing and arts, and physical and health education. They gave no place for religious education and traditional subjects.

   Method of direct experiences and observation, play way method, and heuristic method are the suggested methods of teaching in naturalism. Teacher is an observer and stage setter in education.
3. **Pragmatism:** Pragmatism is an attitude, a method, and a philosophy that employs the practical consequences of ideas and beliefs as a standard for determining value and truth. Kilpatrick, John Dewey, William James among others are the chief advocates of pragmatist ideology.

   It does not have a belief in the existence of values like truth, beauty, and goodness. It stands for relative (based on our practice) and not for absolute (predetermined).

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The basic philosophical postulates of pragmatist philosophy are the following.

- Believes in changing nature of eternal values
- Experience is the core of reality
- Believes in testing and experimentation
- Faith in the present as well as immediate future
- It is humanistic in nature
- Believes in social values
- Believes that the development of personality is possible with continuous interaction with environment

Education should aim at training the students to develop values for themselves. Knowledge should not be imparted and it should be constructed, that is, students should be enabled to create it from their own activities as well as experiences. Education according to pragmatism is meant for harmonious development. It supports the learner to equip with social efficiency and proper adjustment.

To acquire the specified aim of education, the system should be child-centered, should be in accordance with the psychological characteristics of the learner. There should be project based and activity oriented methods of teaching in the curriculum. Pragmatic curriculum is based on the principle of utility and principle of integration. The teacher is considered as a friend, philosopher and guide. Teacher should be the embodiment of knowledge, intelligence, efficiency and practice.

4. **Realism:** It is considered as a belief which looks upon the world as it seems to us, to be a mere phenomenon. Realism regards the physical world as real. It argues for reality and practical knowledge. Milton, Erasmus, Francis Bacon, Comenius, Russell among others are the chief exponents of realism. The basic tenets of realism are-
   - It emphasizes on physical aspects of universe
   - Considers universes as independent of mind
   - Considers only reality as real
   - Considers God and soul don't have any existence
   - Emphasizes the role of senses in attaining knowledge

   Realists advocates that education should aim:
   - To produce a man capable of handling the world affairs who will be in a position to adjust with the environment and
   - The attainment of qualities- in terms of physic, sociability, intelligence, and morality in the process of making a complete man.

The realists oppose bookish and abstract knowledge and they want to bridge the gap between the situations and life at school and the outside life. It is possible only through inculcating teaching and learning on real issues. Realists demand for vocational subjects. They emphasize science subjects and argue that the curriculum should possess utility. Mother-tongue and physical education are given important position in realism and it suggests for the introduction of subjects like mathematics, economics, history, geography, political science, law, etc.

Realism advocates for inductive method, correlation method, sensory method, and method of observation and experimentation. Teacher is considered as a stage setter and observer.

Now we have learnt the basic philosophies in terms of their importance in structuring the curriculum. Similarly, there are some other philosophies similar to those who deal with education and curriculum. It is also relevant to see these philosophies, which have been categorized as other philosophies.

(c) Other philosophies and education

1. **Existentialism:** It is a modern philosophy and is against many outlooks and methods of traditional western philosophy. Existentialism is a protest against totalitarian movements. It is an attempt to reach the innermost core of human existence in a concrete and individual fashion.

   The existentialist sees the world as one personal subjectivity, where goodness, truth, and reality are individually defined. Reality is a world of existing, truth subjectively chosen, and goodness a matter of freedom. According to existentialism man should be the master and machine should be the slave. The basic characteristics of existentialism are-
   - Man is the centre of the universe and the basic feature of human personality represents his uncontrolled freedom
   - Existentialism gives emphasis on man's inner life and experiences
   - Freedom is the watchword in existentialism
   - It holds that action is the only thing that enables man to live
   - It argues for suitable opportunities that enables self-realization
   - It states that man is neither alone nor complete
   - Mind is considered as the source of all knowledge
   - It does not believe in values

   Existentialism puts forward that the aims of education are to make a complete man, to develop a balanced personality, to enrich the mind, to enable one to lead a good life, to enable man to have better choices, and to preserve the freedom of man.

   Existentialists do not argue for a rigid curriculum since they place freedom at the top. All the subjects in schools should enable the learner to develop in a better way. They give first place to humanities, especially arts and literature. They assign second importance to social sciences. They consider the moral and religious education as important in curriculum. Existentialists consider teacher as a base of education who fosters the individual growth. Teacher has to engage actively and need to face all the challenges. They recommend Socratic Method, self reading, and learning by doing; but discourage mechanization and group methods.

2. **Constructivism:** Vygotsky through his constructivist philosophy to education stresses that cognitive development is a social activity. He adds that activities in the cultural development of child appear twice: on the social level, and on the individual level. Child develops his/her own thoughts and attitudes through social interaction and communication with peers and other members of society. Child can also learn by observing the activities and interactions of others in a social setting.

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Teachers should keep in mind all these and need to interact meaningfully with student. Depending on the social context of the classroom, a student may benefit from being able to interact freely and socially with other students as they learn.

Vygotsky focuses on the importance of language and communication. To him, language and thinking are inescapably linked, and even though they first appear independently in infants, they quickly merge into a single function as humans develop into fully social beings. The teacher must carefully define and explain new scientific terms which will help the students to develop the appropriate thought processes associated with the scientific concepts and their labels. Vygotsky insists that we should consider the socio-cultural context of learning and the environment outside of school.

Learning is simply the process of adjusting our mental models to accommodate new experiences.

- Learning is a search for meaning by an individual.
- Meaning requires understanding the complete as well as parts of a concept or idea.
- In order to teach well, teachers must understand the mental models that students use to perceive the world around them.
- The purpose of learning is for an individual to construct his or her own meaning and not to just memorize.

3. **Perennialism:** The most conservative, traditional, or inflexible of the other philosophies is perennialism, a philosophy drawing heavily from classical definitions of education. Perennialists believe that education, like human nature, is a constant.

Perennialism is a reactionary educational philosophy that would return the content of education to its very earlier roots. Knowledge of truth, beauty, and goodness would be at the core of education. Similarly, the cultural heritage and social implication would not be considered as important. According to the philosophy of perennialism knowledge is universal and eternal. Absolute reality is ideal reality.

Perennialism is consistent with the religious conceptions of divine control over life and according to perennialism religious conception is not a necessary characteristic. They also believe in the form of knowledge that is external to human beings. Truth and good are self-evident. Perennialism considers knowledge as eternal and it would bring the study of the great works of the past to centre stage.

Education has the function of awakening the latent rationality residing in children. Learning is reasoning and not mere doing. The curriculum should be the reflection of the diversity of children's interests. All children should become familiar with and sensitive to the great works.

Schools for the perennialist exist primarily to reveal reason by teaching eternal truths. The teacher interprets and tells. The student is a passive recipient. Since truth is eternal, all change in the immediate school environment is largely superficial. The educational ideals of perennialism are-

- We should teach the principles that are of everlasting importance to all people everywhere.

- Education should be the same for everyone irrespective of any barriers.
- Exposure to finest thinkers of history should be given as models for discovery.
- Education should address the questions that persist over time.
- Lecture, coaching, seminar, and Socratic dialogue are the methods of teaching.
- As per this philosophy, education is teacher directed.
- The major goal of education is independent reasoning.
- Curriculum focuses on great ideas using the Great Books

Perennialism does have a great influence today which has a policy of inclusion, i.e., all children can learn the same quality of knowledge. Similarly, it is argued that individual differences must be compensated by remedial or supplementary instruction.

4. **Essentialism:** Essentialism emphasizes cultural heritage. Similarly, it advocates for the need to pass on to the younger generation the knowledge as well as the skills essential to the continued functioning of our society.

As per essentialist philosophy, mathematics, sciences, and the other stores of basic knowledge are the basis of learning. It gives importance to time-tested content that has proved its worth to society. Essentialism would emphasize the knowledge that is well established and functioning in the present world. Knowledge is developed usually in a relatively recent past.

Education has the function of cultural conservation. It has the responsibility to pass along the principles and foundations of cultural conservation. Essentialism is a conservative philosophy of education that expects change to come in an orderly fashion along the pathways that have already been laid. Beliefs and institutions are intrinsically good and are the important parts of reality.

Schools are the means of maintaining the cultural structure of society. Schools have the duty to develop the certainty and trust to sustain the culture and society. Education should contribute to discover the intact laws of worldly existence. Education should help human kind to adjust to these laws and the society that has developed within the context in which they live.

5. **Progressivism:** This philosophy has its roots in the pragmatism of the late nineteenth and early twentieth century. According to Brameld, 'it is the reflection of technological, experimental, worldly habits and accomplishments that have powerfully shaped the modern culture.'

Progressivism is a philosophy that builds the seeds of revolutionary change into its very texture without suggesting what the change shall be. Progressivism is characterized by an open-minded and flexible attitude that views all knowledge about the world in a state of fluctuation. To progressivists, the universe is in a continuing state of development with new experiences integrating into the existing mass of prior experiences.

Progressivism represents the quintessential philosophy of education for a democratic society. It believes in an underlying belief in each individual's ability to deal with the greater questions of the world. Similarly, it proposes that each one has the ability to actively participate in solving the problems of society. Progressivism would pursue knowledge of the processes contributing to the effective decision making of people confronting the problems of the present.

NOTES

Education should meet the capacities of each individual. It should develop the abilities and capacities so as to ensure the greater involvement of everyone in decision making as well as problem solving process of society.

According to progressivists, knowledge is both social and individual and is the product of activity; education prepares people to engage in the decision making process of the community in an effective and desirable way.

Schools should start with interests and problems close to students. Schools should guide the students to achieve greater control of abstract knowledge and this can be achieved in a gradual manner. It advocates for inquiry based learning and problem solving method. Both of these ensure maximum participation and initiation of students. Education should be experience centered, dynamic, and specific to the world around the learner. Curriculum should be more than child centered. For realizing this curriculum schooling should be experience centered- involving the body, mind, feelings, and emotions of the child.

It means basing instruction on the needs, interests and developmental stage of the child; it means teaching students the skills they need in order to learn any subject, instead of focusing on transmitting a particular subject; it means promoting discovery and self-directed learning by the student through active engagement; it means having students work on projects that express student purposes and that integrate the disciplines around socially relevant themes; and it means promoting values of community, cooperation, tolerance, justice and democratic equality.

Pedagogical progressivism proposed to do a lot more than just making schools efficient. It called for turning education upside down, by having the purposes and interests of the students drive curriculum rather than forcing the curriculum onto the student. It offered a way to free schools from artificial constraints and rigid disciplines and unleash the student's natural impulse to learn. It proposed to recreate the classroom as a model democratic community of learners, which could become a way to reduce injustice and enhance democratic equality in the larger society.

Early progressive educators wanted to work on all aspects, namely, the intellectual, physical and emotional aspects of a man. John Dewey took the original definition of Progressive Education and broadened it to include the student as an active participant in his/her education, prepared to contribute to a democracy. One of the primary functions of schools, according to progressivists is to prepare citizens for full participation in democracy.

According to progressivist thought, the skills and tools of learning include problem-solving methods and scientific inquiry; in addition, learning experiences should include cooperative behaviours and self-discipline, both of which are important for a democratic society.

6. **Reconstructionism:** It is a further elaboration of progressivism. According to reconstructionism, the established institutions of society are no longer sufficient to deal with the problems.

   Reconstructionists have a utopian view of a just society in which all the members contribute to the benefit of the group and thus to each other. Reconstructionism is a human centered as well as futuristic philosophy which would conceive of a grand social design that would guide the activities of society towards better life. Reconstructionism would develop knowledge of what the future should be and the means for reconstructing society in order to achieve the suitable development for desirable future.

   Schools are to be instrumental in fulfilling the utopian vision of a new and better social order. Similarly, they are to be used to achieve a planned set of outcomes for a better life. Schools are the media for enriching and enhancing the cooperative mentality. Educators who promote the Social Reconstruction ideology view curriculum from a social perspective. They have faith in the ability of education, through the medium of curriculum, to educate 'the masses of humanity' to critically analyse themselves in relation to their society, understand the ills of their society, develop a vision of a better world based on the concept of social justice and actualize that vision.

   Social Reconstructionists assume that education has the power to educate people to analyse and understand social problems, envision a world in which those problems do not exist, and act so as to bring that vision into existence. Thus, education of individuals is appropriately revitalized so that schools can lead to social transformation.

   Social Reconstructionists want to reconstruct society through social processes. Their first concern is the education of the group and then the education of the individual. From this perspective, learning experiences are construed to be group experiences that take place through human interaction, and the focus is on the 'group mind' rather than the 'individual mind.'

   Schools should teach the child not only to develop socially but also to participate in the social planning as well. Learners must see how society plays a critical role in evolving people. Learners must also be convinced of the validity and urgency of change.

   The primary purpose of the social reconstructionist curriculum is to confront the learner with several problems that humankind faces. The curriculum does not have universal objectives and content. Teacher must relate national, world, and local purposes to the students' goals. Cooperation with the community should be ensured by the teacher.

7. **Secularism:** It is a belief that state, morals, and education should be independent of religion. In another words, it is a belief that religion should not enter into the functions of the state. Secular education is advocated for- the development of moral outlook, the development of wider attitude and to make one dynamic, the development of pluralistic outlook, the development of democratic qualities like liberty, equality, fraternity, and cooperation, the promotion of cultural development and the development of scientific spirit.

   Lessons should be free from religious bigotry and biases. Good ideas and values of different religions can be presented appropriately. Activities should be for developing religious harmony and mutual cooperation. Scientific spirit is more emphasized in secular curriculum. Teachers should be democratic in nature and broad minded.

8. **Scientific Humanism:** It considers both scientific and humanistic aspects of life in explaining education. Science helps to improve life by resolving problems and plays a vital role in the progress and improvement of human life. Similarly, life is spiritual as well. It is argued that science alone cannot bring forth progressive change in human life. Along with science there should be teaching of humanities, social sciences, aesthetics and religion.

Considering the postulates of different philosophies on education and curriculum, it can be concluded that a curriculum should be a reasonable one in terms of its subject matter and method of teaching. While developing a curriculum if the planners keep in mind the different viewpoints of various schools of philosophy they can structure it in a comprehensive and balanced manner.

2.2.1 Suggestions to Curriculum Framers and Teachers

The following are the suggestions for improving the primary-stage school curriculum:

- The gap between curriculum planning, formulation and its implementation should be minimized. Curriculum should be revised and reviewed after every five years.
- The social, cultural, demographic, environmental and economic conditions of the country should be kept in mind while developing school curriculum.
- The activity based approach, learning by doing, learning without burden and joyful learning should be followed in preparing curriculum.
- Both Physical Sciences and Social Sciences should be integrated into Environmental Studies.
- The integrated approach should be followed in preparing the textbooks. It will lessen the burden on children. The essential/core components of curriculum should be followed for maintaining equal standards.
- All sections of the society should be involved while preparing curriculum.
- Rigorous intensive in-service training for primary school teachers should be organized for their capacity development in different subjects on a regular basis. Monitoring and supervision of in-service training should be conducted regularly.
- Continuous and comprehensive evaluation should be made more effective and should be included in the curriculum.

The following suggestions would be helpful in the improvement at the upper primary stage in school curriculum:

- The syllabus of social studies to be reduced (West Bengal, Arunachal Pradesh and Maharashtra) Outdated information should be deleted for reducing the curriculum load.
- Stress should be minimized by of providing activities through arts, work education, health and physical education. (Gujarat, Delhi, Uttarakhand, Madhya Pradesh, Kerala)
- The needs of coastal, hilly, tribal, regional areas are to be focused in school curriculum.
- Local specific examples to be included in history, geography, science and mathematics subjects. The examples on morals and values set by Educationists,

Thinkers and Philosophers to be incorporated in curriculum.

- Feedback and remedial work should be strengthened. Weightage to be given out of classroom activities.
- Emerging issues and concerns like globalization, privatization and liberalization to be included.
- The competency and content enrichment to be provided to teachers through in-service education programmes.
- Curriculum should be framed in such a way that CCE (Continuous Comprehensive Evaluation) and grading system can be introduced
- Play way/Games/Role play/Puppetry/ performing Art should be introduced. If possible figures/ diagrams must be localized state wise.
- Illustrations and examples should be included in the curriculum and capacity building programme for school teachers to be organized on regular basis.
- Regular and intensive training programme for elementary school teachers should be organized in the area of teaching methodology, evaluation techniques and classroom teaching.
- Modules for in-service training programmes should be developed according to the needs of the teachers.

The following are the suggestions for improving the secondary-stage school curriculum:

- Value education, art education, physical and health education and work education should become integral part of 10-year school curriculum and more weightage should be given to these areas in school curriculum.
- Higher level of knowledge should be included in science and mathematics.
- The syllabus of social sciences should be reduced and integrated approach should be followed for teaching of social sciences.
- The curriculum should have clear-cut future directions for career making so that the students can choose science, commerce or arts.
- Outdated information, difficult concepts to be deleted for reducing curriculum load.
- Linkages to be established between secondary and senior secondary curriculum.
- The curriculum should include Information and Communication Technology (ICT).
- Local examples, specifically to be included in the social sciences, science and mathematics.
- All sections of society including workers, experts, teachers, educationists, elected representatives to be involved in framing curriculum. Their opinions and suggestions to be considered.
- Grading and Continuous and Comprehensive Evaluation should be introduced in the evaluation system.
- The school curriculum up to secondary stage should be visualized as a unit. The totality should reflect the continuity of curricular activities.

- Capacity building programme for secondary school teachers about new techniques and methods of teaching, use of audio, video aids in classroom teaching to be organized on regular basis.
- School Curriculum should be revised on the basis of NCF-2005. Science Subjects should be clearly indicated as physics and chemistry and not as physical science. Stress must be laid on mathematics and vernacular classes.
- Practical work should be encouraged in all subjects i.e. science, mathematics social studies and languages.

CHECK YOUR PROGRESS

1. How is progressivism essential for a democratic society?
2. How is 'knowledge' regarded by the philosophy of perennialism?
3. List some of the characteristics of existentialism.

2.3 PSYCHOLOGICAL FOUNDATION

We have seen that philosophy helps the curriculum planners to address the following concerns:

- What are the objectives
- What content / subjects are to be incorporated
- How to impart or what type of learning experiences are to be provided
- What type of role a teacher has to play
- What method is suitable for teaching different topics among others?

Now we are going to study the role of psychology in the development of curriculum.

Psychology and Education

Psychology is the systematic scientific study of behaviour and the knowledge that results from that study. It studies the overt as well as covert behaviour. Psychology considers that all human functions are determined and carried out by some mental processes. There are many branches to psychology dealing with specific topics. Educational psychology, one of the applied forms of psychology, deals with how people learn. With the knowledge of educational psychology teacher can stimulate, motivate, guide, direct, test and evaluate the learning of children. The psychology of child development indicates that each individual has certain capabilities, abilities, interests, attitudes, intelligence and many other potentialities. Similarly, everyone has certain needs- physical, mental and emotional; and further all have some kind of psychological problems. The psychology of individual differences indicates that no two are alike.

Pedagogy and psychology run side by side, and the two should be considered congruent features of good education.

Important assumptions on curriculum

It is clear that curriculum should be flexible enough to allow its adaptation to the special needs of children. Teachers must view curriculum as a process of planning the best possible programme for children, parents and teachers. The following assumptions on curriculum are very important that reveal the psychological foundations behind curriculum.

- Curriculum is related to the overall quality of the programme.
- Curriculum must focus on the 'whole child' and programmatically integrate areas of development.
- Recreation and leisure serve many functions and these should be taken into account in curriculum.
- Teachers must agree with the philosophy and practices of the curriculum and understand its content so as to ensure effective teaching considering the individual differences.
- Teachers must understand the development and theories of learning.
- It should be considered that children are active learners.
- Curriculum should be developmentally appropriate.
- Curriculum should reflect the role of social and cultural contexts in children's development and learning.

What are the ingredients of meaningful curriculum? A meaningful curriculum should be in accordance with the mental abilities, personality characteristics, capabilities, and behavioural qualities of children. Moreover, it should cater to the intellectual, emotional, social and aesthetic needs of the learners. To meet the individual differences, it is appropriate to incorporate as many activities and multiplicity of programmes as possible. Thus, the content of curriculum should make a liberal provision for a variety of subjects, courses that are theory based, practice oriented, and vocationally designed. Moreover, there should be core, elective, optional, advanced, add-on and remedial courses in the curriculum.

The curriculum should include:

- Certain subject areas which can be learnt by students of average physical and mental abilities
- Subject areas of special interest to a few learners to meet their special needs
- Subjects and activities which will be competent enough to cater to the needs of gifted and talented ones
- Subjects and or programmes of remediation to the backward students or slow learners
- Provisions for creative and multi talented learners special measures to socially and culturally deprived children.

Recently new materials have been devised, tried out in the classrooms, and then revised in terms of findings gleaned from an analysis of teaching and learning problems. Knowledge of child development has been put to use in actual classroom learning.

Experimented approaches of psycho-friendly curriculum

As per the considerations of psychology of education the following considerations were employed and experimented in different countries over the globe, in order to incorporate the psychological basis of education in curriculum.

- The principle that students can be introduced to a subject as early as desired, provided it is presented properly and the students have the prerequisite background of experience.
- Transfer of learning is enhanced when basic concepts, generalizations, and processes of inquiry are given emphasis.
- Guided discovery of relationships is proven effective for more efficient and permanent learning.
- Interest and motivation can be generated through the lure of inquisitiveness about the subject. The same students can be guided and taught how to raise questions, how to relate and find out the relationships, how to interpret the findings derived, how to formulate principles, and how to engage in different forms of inquiry.
- Meaningful verbal learning, i.e. the organizing of facts into conceptual schemes that can be used to generate ideas, ask questions among others.
- Inductive approach is suggested because of its value in promoting curiosity about the subject. They help in making generalizations as well.
- Deductive approach is good for developing skill in explaining new facts, formulating hypotheses and interpreting information.
- The study of selected topics in depth is required than the study of many in superficial.
- Depth and breadth of learning are attained through recurring encounters with concepts, processes, theories and generalizations of higher cognitive levels.
- Learning is enhanced if it is continuous and linked. When there is a conceptual and process continuity if will be very effective.

Curriculum and learning hierarchy

What learning is, how learning takes place, and the characteristics of learners are to be the considerations in the design and development of curriculum. While talking about learning, important thing is the ordering of material and subjects as per the relevance. To plan sequences of instructions directly related to the teaching and learning process, the theory of hierarchy of learning by Gagne is very helpful to the curriculum planners. Sequences of instructions should be planned in hierarchies to provide for the attainment of specific terminal behaviour. Let us discuss in brief the hierarchy of learning.

Gagne identified eight forms of learning and arranged it in a hierarchy. They are:

1. **Signal learning:** It is the development of a reflexive response to a signal by repeating the signal in proximity to an unconditioned stimulus. It is the first form of learning.
2. **Stimulus-response learning:** It is referred to as trial and error, operant, or instrumental learning. It is the initial stage of learning words.
3. **Motor chaining:** It is the connection of a set of stimulus response learning. It consists of operating a model and use of science equipments.
4. **Verbal association:** It consists of learning sequences of sentence patterns and memorizing verbal expressions.
5. **Multiple discrimination:** It is the learning to make different responses to objects and events and to distinguish among them.
6. **Concept learning:** It is learning to put objects or events into a class and responding to them as a group.
7. **Principle learning:** It is the learning to link concepts to each other to show relationships as in generalizations.
8. **Problem solving learning:** It is the use of principles to attain a goal and thereby learning a higher order principle that change the learners capability.

Now let us discuss the theories of development and learning.

Theories of development and learning

The foundation of all curricula is developmental theory, i.e., how children develop and learn. The developmental theory from which a curriculum originates may be explicit or implicit. Different theories are discussed below:

1. **Socio-cultural Theory**: Lev Vygotsky in his theory emphasized the following.
   - Influence of society and culture on children's development
   - Role of languages in developing higher order thinking skills
   - Importance of play in enhancing social and cooperative behaviour
   - Zone of proximal development in helping children to learn; it is the remoteness between the actual developmental level as determined by learner through independent problem solving and the level of potential development as determined through problem solving in association with others.
   - Children must share their knowledge with others who may be thinking in a different way to derive at a conclusion on shared understanding.
   - Emphasizes the role of imaginative play that may enhance cognitive development of strengthening memory and reasoning power. Moreover, it causes for enriched language development and increased social competence.
2. **Multiple Intelligence Theory:** Gardner proposed seven kinds of intelligences namely, linguistic, logical-mathematical, musical, bodily-kinesthetic, spatial, interpersonal and intrapersonal intelligences. The basic ideas are:
   - Children differ in the strength of all intelligences.
   - Family, culture and community influence the development of intelligences and the way the intelligences are expressed.
   - Curriculum must offer children a diverse array of opportunities to foster development in all the areas of intelligences.
   - Assessment must go beyond the areas typically associated with academic achievement.
3. **Cognitive Development Theory:** Jean Piaget put forward a theory of human development which is relevant to education. He proposed four stages of cognitive development. It is shown in figure 2.2.

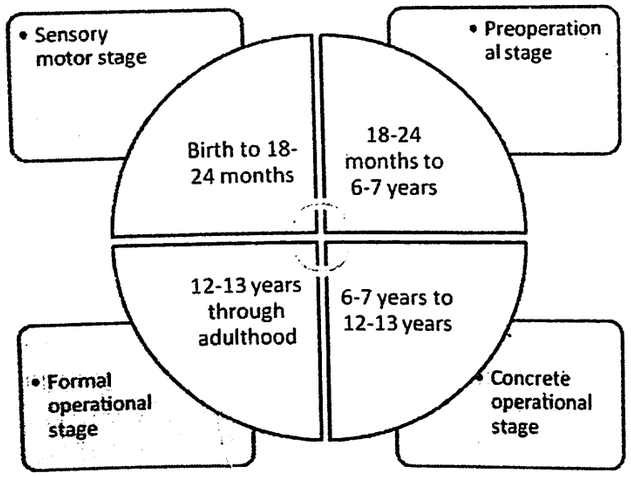


Fig. 2.2 Cognitive Development: Stages

The postulates of the theory are:

- There are several processes that describe development and learning.
- Learning occurs as children construct knowledge through active exploration and discovery in their physical and social environments.
- Children assimilate when they match concepts, skills and information gained from their experiences with the environment to their previous understanding pattern.
- Accommodation occurs when the mental scheme must be changed to fit the new and to incorporate it in the cognitive structure.

Cognitive theory considers learning as a cognitive activity. Cognitive development according to them is a product of interaction of the environment with the intellectual potential and activities of the individual. Cognitive approach leads to logical methods for organizing and interpreting learning. The hierarchical system of cognitive stages has often been taken as the foundational basis for structuring the curriculum. They are (a) the content of the curriculum should reflect the stages of development (b) children should not be requested to perform at a cognitive level prematurely, and (b) once child has entered a cognitive stage, experimental enrichment contributes to increased abilities associated with the stage.

4. **Behavioural Theory:** Watson, Skinner, Pavlov, and Bandura are the main proponents of this theory. This theory focuses on objective and observable principles that influence human behaviour. The basic ideas can be summarized as:
   - Pavlov in his stimulus response theory states that an unconditional stimulus and unconditioned response are used to elicit a conditioned response to a conditioned stimulus.
   - Skinner's theory of operant conditioning is an explanation of behaviour that allows for many actions and behaviours being performed spontaneously, not always in response to something else.
   - Learning is viewed as a process whereby a child is conditioned to display expected behaviour and knowledge through the use of reinforcement and punishment.
   - Both human and physical factors in the environment should be tailored to produce predictable results in learning.
   - Bandura in his social learning theory attempted to describe the cognition of individual.
   - Social learning theory recognizes that observation, modeling and incidental learning have a key role in children's learning and behaviour.

Curriculum according to the behavioural school of thought is based on

- Specific objectives which are well defined
- Suitable instructional materials and media as per the capacities of the learner
- Importance to skill acquisition
- Place for diagnostics and remedial measures
- Place for positive reinforcement
- Modification of behaviour through specific tasks and step by step activities.

5. **Psychodynamic Theory:** Sigmund Freud and Erik Erikson explained learning in a different way. Fred emphasized emotional and psychological aspects of children. As children move through different stages of development (Oral, anal, phallic, latency, and genital), their development and behaviour is explained by the action of three subconscious forces- id, ego, and superego.
   - Id is the inborn desire which drives the present at birth and is based on pleasure principles.
   - Ego develops during the anal (1-3 years) stage and is based on reality principles.
   - Ego controls emotions, thoughts and behaviour.
   - Superego develops during phallic stage (3-5 years). It is based on the principle of morality and it represents ethical values.

   Erikson puts forward eight stages of development called as stages of psychosocial development. These stages specify identity crisis or task that each person must resolve at each stage. The successful resolution of each task during each stage results in the ability to perceive the world and self correctly. It ensures the development of a healthy personality and mastery of the environment. Curriculum planners have a lot to adapt from these theories.

6. **Maturational Theory:** Hall, Havighurst, and Gesell are the chief exponents of this theory. Havighurst believed that developmental tasks are those things a person must learn if he or she is to be evaluated. Moreover, this will also help him to evaluate whether he is a happy person or not. Similarly, Gesell developed an array of tests to assess and describe children in ten areas of development. Each category includes numerous areas on which assessment is required. He assessed the following categories of development.
   - Motor
   - Personal hygiene
   - Emotional expression
   - Fears and dreams
   - Self and sex
   - Interpersonal relations
   - Play and leisure time
   - School life

- Ethical sense
- Philosophical outlook

The tested data on different ten areas were used to develop gradients of development that described norms at various stages. Gesell believed that child's genetic endowment determined development and behaviour and that internal maturational factors guided growth and development.

7. **Field and Gestalt Theories:** It considers that human beings are innately interactive. Observing physical interaction between the individual and the environment is relatively insignificant. Therefore, the psychological change in the individual is important. Here learner variables occupy an important position.

   Early field theorists were known as gestalt theorists. They viewed perception and learning as holistic experiences based on the grasping of patterns and configurations. They viewed that whole is greater than the sum of its parts. Kohler and Wertheimer are the major Gestalt theorists. The Gestalt laws of learning are-

   - **Law of similarity:** The pattern or relationship among the components is created by their similarity.
   - **Law of proximity:** Items that are closer to each other in space, time, are grouped together.
   - **Law of closure:** It refers perceptually to enclosed areas that form holistic units more readily than do areas delineated in open fashion.
   - **Law of good continuation:** It refers to the perceptual and logical completion of incomplete pattern.

8. **Humanistic Theory:** This theory considers human beings as unique and distinct from all other species. They considered complex traits such as feelings, attitudes and hopes as essential to the understanding of humanness. Moreover, it is not enough as a study of humans in terms of perception and cognition, but they need to be studied outside the laboratory.

Abraham Maslow is the main exponent of humanistic learning. He has developed a theory of human needs and motivation. Maslow identified basic human needs and arranged these into a hierarchy of prepotency. This became a backbone of many curricula. Definitely, this would be a consideration for planners of curriculum. The need hierarchy of Abraham Maslow is shown in Figure 2.3.

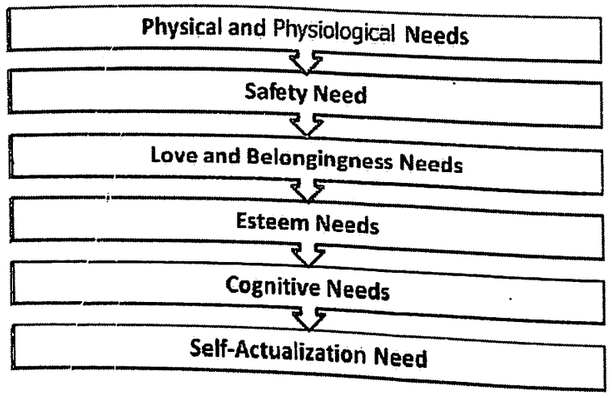


Fig. 2.3 Hierarchy of Human Needs

We have seen different theories of learning and human development. It is of importance that for every curriculum the consideration of different aspects of psychology is required. Basic needs, individual differences, maturation, developmental stages, etc., are to be taken into account while structuring a curriculum.

2.4 SOCIOLOGICAL FOUNDATION

We have learnt psychological foundation of education–different development and learning theories and need of considering individual differences now. Similarly, while selecting and structuring or restructuring the curriculum there should be some considerations on socio-cultural aspects and issues. Let us discuss these aspects in detail.

Society and Education

Society and education are related to each other. The purpose of schooling is to serve the needs of the society. Similarly, society and its perceived demands form the basis for content selection for schools. Therefore, the curriculum should be in accordance with the demands of society–existing as well as emerging. Secondary Education Commission states that 'curriculum must be vitally and organically related to community life.'

Another way in which the social setting is utilized as a source of content may be found in the illustrations of contemporary situations that are selected to highlight concepts and main ideas from the disciplines.

Social and Cultural Considerations in Curriculum

How are society, culture and curriculum related to one another? Teachers and other professional educators have realized that society and culture have a major influence on education.

The features of society that influence the education as well as teaching and learning endeavour are:

- The diversity prevailing in society in terms of religion, language, region, caste, community, etc.
- The standards and mores prevailing in different societies.
- Facilities of transportation, communication among others.
- Impact of westernization and modernization and their variation.
- Pattern of discipline prevailing in different communities.
- Child rearing practices of the society and the prevalent parenting styles.

These factors would influence the making of curriculum either directly or indirectly. Other social forces which have a major influence on education comprise separation leading to student attrition, misuse of resources, reducing contact of parents with children, organization of class structure as per the different patterns of values, and teacher empowerment by school-based decision-making.

The needs stimulated by social and cultural conditions are met through educational policies and plans. It is necessary that potential teachers and experienced educators should be aware and be skillful in following the course of policy development and examination considering the different dimensions of social life. The following considerations have to be taken into account.

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- Teachers and professional educators need to understand the major sociological and social psychological theories with the aim of analysing objectives, social processes, organization and improvement of formal and non-formal education.
- Preparation of teachers and professionals of education should involve knowledge of human social development.
- Specific contextual theories like functionalism, symbolic interactionism, psychoanalysis, behaviourism, cognitivism, constructive ideology, modern vs. postmodern approaches, emotional intelligence, cross-cultural methodology, cultural learning, etc., are to be taken into account because these theories have high social impact.

There are many social forces which influence educational process and purposes such as:

- Family and its value system and structure.
- Culture- including cultural identity, diversity, patterns of socialization among others.
- Race, ethnicity, citizenship and educational issues of multiculturalism, group and individual identity, desegregation, change of attitude and effects of incorporation.
- Social class- class differentiation and education, consequences of class, social mobility, socio-economic status, social reproduction, stigma of poverty and meritocracy.
- Gender issues- socialization processes, motivational comparisons, and role definitions.
- Alienation- including student attrition, substance abuse and gangs.

Schools are an integral part of society and are established for the development of society. School influences society through its curriculum- the way and plan of teaching and learning and other activities. Through teaching of curriculum, schools can influence the way society functions. Similarly, society also influences curriculum in several different ways. No curriculum will be a success without reflecting the society in which it is being enacted. It is essential to examine the social forces that create the curriculum. The following issues need to be addressed while creating or designing a curriculum:

- The extent of influences that are experienced outside school on a good curriculum
- Changes occurring in society and their affect on curriculum

Society-related curriculum should be connected to the level of knowledge that is required by an average person in daily life. It should be futuristic and sufficient to get a career. It should fulfill basic and unavoidable needs thrust by society as a mandatory qualification to various degree and professional courses. The basic minimum should be ensured by imparting the curriculum.

Cultural Diversity and Curriculum

Diversity is becoming a very common feature of society. This can especially be observed in urban areas. In the present day, society is now characterized as being extremely multicultural, multi-ethnic, and multi-religious. It has been mentioned earlier in the text that curriculum influences society and in a similar manner society influences curriculum. Therefore, it is of utmost significance that curriculum designers comprehend the diverse

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changes taking place in society and integrate them in the curriculum so as these changes are reflected in the curriculum. Globalization has become the culture of this rapidly-changing world. This will result in society becoming more diverse as human migration will bring new values and new teachings which will develop a new way of life. Therefore, curriculum should address these requirements of society.

Educators and policy planners should incorporate the learning experiences and content desirable enough to ensure the assimilation or integration of the diverse groups. This will involve an understanding of different cultures, religions and ethnicity. Cultural diversity of pluralism recognizes that society is composed of numerous voices and ethnic groups. Curriculum should be flexible to consider all the peculiarities of these diverse groups of society to meet its real goals. Hence, it is essential to establish different programmes, pedagogical approaches and strategies, flexible nature of curriculum and different educational environments to meet the demands of all types of students.

2.4.1 Use of Technology in Curriculum Development

The judicious use of technology can increase the reach of educational programmes, facilitate management of the system, as well as help address specific learning needs and requirements. For instance, mass media can be used to support teacher training, facilitate classroom learning, and be used for advocacy. Possibilities of teaching and learning at varied paces, self-learning, dual modes of study, etc. could all benefit from the use of technology, particularly ICT. The increasing use of the Internet has enabled the sharing of information and provided space for debate and dialogue on diverse issues hitherto unavailable on such a scale. Technological innovations are also necessary for appropriate equipment and aids for meeting the learning requirements of children with special needs. What needs to be underscored is that technology could be integrated with the larger goals and processes of educational programmes rather than viewed in isolation or as an add-on. In this context, technological use that turns teachers and children into mere consumers and technology operators needs to be reviewed and discouraged. Interaction and intimacy are the keys to quality education, and this cannot be compromised as a principle in any curricular intervention.

2.4.2 Modernization and Innovation of Curriculum Development

Individual teachers often explore new ways of transacting the curriculum in addressing the needs of students within their specific classroom context (including constraints of space, large numbers, absence of teaching aids, diversity in the student body, the compulsions of examinations, and so on). These efforts, often pragmatic but also creative and ingenious, by and large remain invisible to the school and the larger teaching community, and are usually not valued by teachers themselves.

The sharing of teaching experiences and diverse classroom practices can provide opportunities for an academic discourse to develop within schools as teachers interact with and learn from each other. This will also encourage new ideas and facilitate innovation and experimentation. How can innovative and creative ways of teaching and learning be encouraged and supported by the system so that they can become a body of practice that can be brought to a stage when they can be built back into the system?

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For a start, there is a need to create structured spaces within schools, and at the level of the cluster and block where teachers are encouraged to share and discuss classroom practices and experiences. If seen as worthwhile, some of these ideas and practices can be systematically followed up. It is also important to bring together groups of teachers within and across schools and provide support to them in terms of resources as well as time to work together. There is also, a need for documentation and research of identified 'good practices'. At present, there are funds for this purpose both with DIETs (part of whose mandate is identification and documentation of innovative practices). SSA also has funds for school-based research. Some of this could be used to document the diverse practices that teachers use in different classroom contexts. In addition to providing the necessary funding, the creation of an enabling environment that nurtures and provides support to such initiatives is also important.

As mentioned earlier, efforts to mainstream innovative processes and practices will be necessary. One of the main objectives of creating resource centres at the cluster level was to break the isolation of individual schools and bring teachers together on a regular basis for sharing their experiences and ideas with their peers. This is important if teachers are to develop their own professional identities and sense of belonging to a larger teaching community. It could also be one way of creating among them a sense of their own agency and fostering a sense of greater involvement and commitment to their work.

Check Your Progress

4. Name the forms of learning as stated by Gagne.
5. Name the various kinds of intelligence as stated by Gardner.
6. Name the major Gestalt theorists.

2.5 HISTORICAL FOUNDATION

A plethora of events can be listed which assisted in the historical development of the curriculum. It might be too, that in individual credited with doing something vitally significant in the past had others who also practiced the same thing, sequentially or simultaneously.

Let us discuss some selected important happenings in the curriculum development.

2.5.1 John Locke and the Curriculum (1632-1704)

John Locke was an early supporter of the opinion that schools should be a pleasant place to learn. During his time, students in schools were subjected to never-ending beatings, whippings, and derision. School was a very unpleasant place to be in. Locke advocated that learning should be made interesting. He believed in the Tabula Rasa theory where a student had a mind like a blank sheet with nothing printed on it at the beginning. With good teaching the mind would imprint positive things. The teacher then is a role model for students.

Instead of rote learning and drill, which was widespread for students in his day, Locke emphasised that students learned through the five senses and then the mind worked on them. The mind then reflected upon sense input to come up with reflections such as doubting, wailing, accepting, modifying, rejecting and relating. Locke's contributions emphasized thinking about what had been taken in by the senses. School was more than drill and memorization. Locke stressed on four broad objectives of education in sequential importance:

1. Virtue which stressed living a decent life and refraining from evil.
2. Wisdom whereby a person develops foresight in order to make appropriate choices in life.
3. Good breeding which stresses being able to work well with others and having good manners.
4. Knowledge objectives which needed to achieve goals.

These four broad objectives emphasize that knowledge alone is not sufficient for a student to achieve anything but being a well adjusted person is more important. Even though John Locke made his proposals in the seventeenth century, his goals on reflection pertaining to what was learned through the senses (sensation) are also minimal. Certainly, Locke's concepts of doubting, modifying, rejecting and relating are important when reading content. He believed that education is more of a process than a product. Ulich (1950) wrote the following pertaining to Locke's emphasis upon attitudinal development within students:

> Starting from the conception that knowledge has to foster, rather than to impede, the growth of an all rounded personality, Locke demanded a method of education apt to encourage initiative, independent judgment, observation, and critical use of reason. He wanted languages taught by conversation, not by grammatical exercise and memorization; generally speaking, he preferred learning by doing to learning by imitation.

John Locke's ideas on education are still important today.

2.5.2 Johann Friedrich Pestalozzi and the Curriculum (1746-1827)

Johann Friedrich Pestalozzi advocated the use of the *object lesson* in teaching. The lesson then would stress the use of real objects in teaching. Thus, if students were to read about a 'dog', a model of the animal or an actual dog would be shown to children. Children then connect the word 'dog' with the actual or model dog. Realism was always related to concept or abstract. During the times of Pestalozzi, the abstract and rote learning alone were emphasised and students were drilled until they achieved mastery. Corporal punishment was used if students did not achieve what the teacher wanted them to learn. Pestalozzi stressed that schooling should be a joyous place to be in and humane methods of instruction should be used. Learning should be natural, not coercive. Rivalry and fear should not be used to motivate students to learn since each student has different talents and abilities. There should be no gulf between home and school; both should work together for the good of the child. Each student has inherent powers to use in learning. Good will should respect these abilities and talents. Pestalozzi was altruistic; he saw the gulf between the rich and the poor and wished the elimination of the same. The children from wealthier homes looked down upon those from poor families. Pestalozzi

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environment. Students were encouraged to exhibit creative behaviour and not mould their products relating to what others had done. They were born with creative tendencies according to Froebel. Creative behaviours are priced highly in today's classroom. Clay modelling, for example, is as important in kindergarten today as it was during Froebel's' times.

Friedrich William Froebel believed that children were born good and not as depraved individuals. He felt that goodness needed to be brought out from within the individual with creative behaviour.

2.5.5 Kierkegaard and the Curriculum ((1813-1855)

Soren Kierkegaard emphasised life as being subjective and filled with the many choices to be made. A philosophy of existentialism was then born. Each decision to be made, from among alternatives, emphasizes subjectivity, not objectivity. Kierkegaard stressed the importance of students making choices and decisions. One first exists and then finds the essence of their purpose in life and is up to the individual to find essence and purpose in life. Each individual chooses and cannot blame others for the consequences of personal choices made. There must be complete freedom to make these choices. Kierkegaard emphasised existentialism as a philosophy of life. Existentialists believe in the following concepts which are faced by human beings in day-to-day situations: feelings of dread, alienation, loneliness, guilt, fear of death, as well as happiness.

Kierkegaard emphasised that there are three stages of development which individuals go through in terms of morality. These are:

1. **Stage One**: **The Aesthetic Phase:** Here, the individual decides for the self and concern for others. The self alone is what is important in life. It definitely is a selfish stage of living. Everything centres around the self.
2. **Stage Two: The Ethical Phase:** In this stage individuals are interested in making authentic decisions. Commitments are made. Strong feelings of anxiety and tension are evident. Choices are made that are awe inspiring. There is awareness of death and the will to one day make for better deeds and acts during this stage. To live a quality life, one must live as if this day is the last. One needs to know oneself well in order to make good authentic choices to fulfil ones duty.
3. **Stage three**: Here, a leap of faith needs to be made in moving from stage two to stage three, which stresses humanness and a desire for the good. Being an authentic being, not a façade, is important in baring oneself to others as one truly is. Being conscientious and having a strong will is needed to possess the ideals of stage three. Faith overcomes doubt and despair.

When making choices from among alternatives subjectivity is involved. Decisions cannot be made objectively since human beings weigh the values of each choice and then makes a decision as to which one to pursue. There is uncertainty when choices are made in life's arena.

It has been a long standing goal, since the early 1900s, for students to be able to choose and make decisions. Being able to make good choices or decisions is as admirable a goal as possible to emphasize in the curriculum as well as in life. Each person is

bombarded with opportunities and chances to choose. Will the involved person then make good choices?

Learning centres in the classroom provide opportunities for learners to select sequential learning activities. If there are seven learning centres in the classroom with four learning activities listed on each task card per centre, there are a total of 28 tasks from which pupils might choose sequentially to participate in. The teacher introduces the centres briefly to pupils and then learners individually may select the centre and sequential tasks to work on. Perseverance is needed to complete each sequential task chosen. There needs to be a commitment to complete what is chosen and be punctual in producing quality work. There is much freedom for learners to make choices in terms of which learning activities to pursue. The learners need to be responsible to do quality work. There is an advantage for students working at learning centres in each academic area:

1. Learners get to complete what is desired and self selected, rather than someone else choosing.
2. Learners may work at his/her optimal speed in completing a learning activity rather than someone else making unrealistic time demands in completing an activity.
3. Learners may select what he/she can benefit most rather than an imposed learning activity which might be too complex or too easy or lacks challenge.

An individualised reading programme might well tress library book titles which deal with the feelings of individuals as indicated by existentialists. A wide variety of tiles and genres need to be in the offing for the child to make authentic choices as to what to read. The benefits of individualised reading to pupils are the following:

- Students may select library books sequentially which capture personal interests.
- Students may choose library books to read of their own unique reading level.
- Students may choose their own optimal reading level.
- Students who like to learn by themselves get the opportunity to do so.
- Students may have a conference with the teacher after the completion of reading a library book. Here, the learner may reveal his achievement in the completed library book and indicate feelings he/she has towards the content read.

In individualised reading, the learner is in control of what is to be read. Decision making is important in individualised reading.

In the original version of individualised reading, teachers held individual conferences with students. In a reading workshop, teachers hold group as well as individual conferences. At the heart of the workshop is the time when student read self selected books, respond to their reading, or engage in group or individual conferences. Self selected books, respond to their reading, or engage in group or individual conferences. Self selected reading may last approximately thirty minutes or longer. If available, the time may be extended, because students will be reading their self selected books independently they should be encouraged to use appropriate strategies. Before reading, they should survey, predict, and set a purpose for reading. As they read, they should use summarizing, inference, and imaging strategies-if appropriate-

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and should monitor for meaning. As they read, students can use sticky notes to indicate a difficult work or puzzling passage...

Response time may last thirty minutes or longer. During response time, students may meet in a literature discussion groups to discuss their reading, write in their journals, work on an extension activity, plan a reader's theatre or other type of presentation, work at one of the classroom's centres, continue to read, or attend a conference. If time allows, circulate around the room, giving help and guidance as needed. Visiting literature circles should be a priority.

2.5.6 Charles Sander Pierce and Experimentalism (1893-1914)

Charles Sanders Pierce was an early advocate of students engaging in problem solving activities. The consequences of an act are the most salient in problem solving. Ideals can be tested in action to see which work and which are of little value. Thus, if two ideas are tested in a life like situation, the consequences of each are noticed. Ideas have to be relevant and vital to be tested. If the consequences of each idea do not matter when tested, they have no worth. One looks at the results, not the intent, to notice the cash value of each idea. This is opposite of learning something for its own sake, since Pierce's philosophy of experimentalism advocated looking at results/consequences to see what has value and what works.

Pierce looked upon belief as occupying a very important middle position between thought and action. Beliefs guide our desires and shape our actions. Doubts in our minds instigate us to think. Through doubt, we try to fix our beliefs so that our actions can be guided. There are several ways in which we can fix our beliefs, according to Pierce. There is the method of tenacity, whereby people cling to their beliefs and refuse to entertain doubts. Another method is to invoke authority. Still another method is that a metaphysician or a philosopher according to Pierce would settle questions of belief by asking whether an idea was agreeable to reason. With all these methods Pierce found himself in agreement precisely because they could not, in his view, achieve their intent, namely to fix or settle belief. What they all lacked was some connection with experience and behaviour.

Pierce therefore offered a fourth, the method of science, whose chief virtue, he thought, was its realistic basis in experience. Unlike the methods of tenacity, authority, and reason, all of which rests upon what a person possesses within his mind solely due to thinking. The method of science is built on the assumption that real things affect our senses as per the general laws and we can assume that it will affect each observer the same way. Beliefs that are grounded in such real things can be verified, and their 'fixation' can be a public act rather than a private one. There is in fact no way to agree or disagree with a conclusion arrived at by means of the first three methods since they refer to nothing whose consequence or real existence can be tested.

Problem solving is important presently and, no doubt, will always remain salient. Each person has problems and needs to identify them, whether in the school curriculum or in society. Each problem needs clear identification. Information needs to be obtained to solve the problem. The information, acquired from a variety of sources, needs to be tested in life like situations. That which works as a solution presents a desired course of action.

2.5.7 Post-Independence Efforts in the Field of Curriculum Development

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One has to give credit to the British for establishing in India an organized modem system of education. From the objective point of view, one cannot condemn the efforts of the British rulers to develop an educational system which served their purposes better than Indian purposes. Even the harshest critic of Macaulay's system would agree that it was effective in producing results, i.e., creating the manpower needed to run the British Empire in India. From the sheer academic point of view, one is wonderstruck by the fact that, even after more than six decades of freedom, it has not been possible to derive a similar kind of satisfaction at having developed a system of education (and constructed a curriculum) relevant to the needs and aspirations of our people!

Recognizing the threat posed by the colonial system of education, especially the alienation of those so educated from their cultural roots, Gandhiji proposed an indigenous system of education, namely, Buniyadi Talim (Basic Education) as expressed in the Wardha Scheme. The curriculum developed under this scheme aimed at the total development of the child, reflecting the Gandhian philosophy of education, i.e., development of Body, Mind and Soul. The failure of this curriculum to emerge as a national curriculum and an alternative to the prevalent alien curriculum indicated the magnitude and complexity of the problems involved in changing the established structure of education and pattern of curriculum and posed a challenge to the Indian nation. Evolving a curriculum commensurate with the country's needs, aspirations and genius is, indeed, a formidable task. The earlier this truth is realized, the better for all concerned with the policy, content and process of curriculum.

Since then, serious efforts have been continuing to restructure the pattern of education and to reconstruct the curriculum. The curriculum reforms generated as a consequence of the recommendations made by the Secondary Education Commission (1952-53), the Education Commission (1964-66) and the National Policy on Education 1986 (NPE- 86), Programme of Action 1986 (POA-86) and the National Curriculum Framework (NCF) are concrete evidence of the efforts being made to generate an indigenous curriculum. While a lot has yet to be attained, considerable success has been achieved in establishing a common structure of education throughout the country, i.e. the 10 + 2 + 3 pattern, in accepting a common scheme of studies for boys and girls, and in incorporating science and mathematics as compulsory subjects and assigning a prime place to work experience therein. The NPE-86 took a bold initiative in including some common components as a core part of the national curriculum. Thus, one would like to assert that, though quite slowly, the challenge for change in the educational system and curriculum is being met.

National Curriculum Framework (NCF)

In spite of the recommendations of the NPE, 1986 to identify competencies and values to be nurtured at different stages, school education came to be driven more and more by high-stake examinations based on information-loaded textbooks. Despite the review of the Curriculum Framework in 2000, the vexed issues of curriculum load and the tyranny of examinations remained unresolved. The current review exercise takes into cognizance both positive and negative developments in the field, and attempts to address the future

requirements of school education at the turn of the century. In this endeavour, several interrelated dimensions have been kept in mind, namely, the aims of education, the social milieu of children, the nature of knowledge in its broader sense, the nature of human development, and the process of human learning.The term National Curriculum Framework is often wrongly construed to mean that an instrument of uniformity is being proposed. The intention as articulated in the NPE, 1986 and the Programme of Action (PoA) 1992 was quite the contrary. NPE proposed a national framework for curriculum as a means of evolving a national system of education capable of responding to India's diversity of geographical and cultural milieus while ensuring a common core of values along with academic components. "The NPE - PoA envisaged a child-centred approach to promote universal enrolment and universal retention of children up to 14 years of age and substantial improvement in the quality of education in the school". The PoA further elaborated on this vision of NPE by emphasizing relevance, flexibility and quality as characteristics of the National Curriculum Framework. Thus, both these documents envisioned the National Curriculum Framework as a means of modernizing the system of education .

Guiding principles

The guiding principles of the NCF are as follows:

- Connecting knowledge to life outside the school
- Ensuring that learning is shifted away from rote methods
- Enriching the curriculum to provide for overall development of children rather than remain textbook centric
- Making examinations more flexible and integrated into classroom life
- Nurturing an over-riding identity informed by caring concerns within the democratic polity of the country.

CHECK YOUR PROGRESS

7. What was Locke's view on learning?
8. State the views of Pestalozzi on the methods of learning.

2.6 SUMMARY

- Curriculum is a totality of what is happening in and out of the classrooms, what are the causes behind, what will be the outcome and so on.
- Despite an increased knowledge base, growing understanding of human development, sophistication in the use of technology and an emerging focus on teaching and learning, curriculum remain primitive and traditional.
- The philosophy of education offers some practical purpose to the teachers. Its most significant role is to help teachers to think more clearly and accurately about different matters and aspects of education.

- Philosophy is the contemplative side of life and is the science of knowledge. It understands man in relation to the universe. According to Dr S. Radhakrishnan, 'Philosophy is a logical enquiry into the nature of reality.'
- We know that education is dealing with how to prepare for life and it aims at making man fit for different life situations.
- Specialists in the philosophy of education have made significant contributions to clarifying the relationship between the nature of knowledge and curriculum development.
- Idealism believes in supernatural powers. It believes in spiritual nature of man. Ideas are believed as unchanging. According to idealist philosophy, education should help in realizing the spiritual nature of the child.
- To achieve these goals there should be in-depth knowledge about the cultural heritage, maturity in thinking, reasoning, and higher order capacities like problem solving and reasoning.
- Naturalism is a type of philosophy which considers nature as the whole of reality. It approaches philosophy from a pure scientific point of view. Rousseau, Locke, Pestalozzi, Tagore, Nunn among others are the major advocates of naturalistic philosophy.
- Method of direct experiences and observation, play way method, and heuristic method are the suggested methods of teaching in naturalism. Teacher is an observer and stage setter in education.
- Pragmatism is an attitude, a method, and a philosophy that employs the practical consequences of ideas and beliefs as a standard for determining value and truth. Kilpatrick, John Dewey, William James among others are the chief advocates of pragmatist ideology.
- Education should aim at training the students to develop values for themselves. Knowledge should not be imparted and it should be constructed, that is, students should be enabled to create it from their own activities as well as experiences.
- Realism regards the physical world as real. It argues for reality and practical knowledge. Milton, Erasmus, Francis Bacon, Comenius, Russell among others are the chief exponents of realism.
- Realists oppose bookish and abstract knowledge and they want to bridge the gap between the situations and life at school and the outside life. It is possible only through inculcating teaching and learning on real issues. Realists demand for vocational subjects.
- Existentialism is a protest against totalitarian movements. It is an attempt to reach the inmost core of human existence in a concrete and individual fashion.
- Reality is a world of existing, truth subjectively chosen, and goodness a matter of freedom. According to existentialism man should be the master and machine should be the slave.
- Existentialists do not argue for a rigid curriculum since they place freedom at the top. All the subjects in schools should enable the learner to develop in a better way. They give first place to humanities, especially arts and literature.

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- The most conservative, traditional, or inflexible of philosophies are perennialism, a philosophy drawing heavily from classical definitions of education. Perennialists believe that education, like human nature, is a constant.
- Perennialism is consistent with the religious conceptions of divine control over life and according to perennialism religious conception is not a necessary characteristic. They also believe in the form of knowledge that is external to human beings.
- Essentialism emphasizes on cultural heritage. Similarly, it advocates the need to pass on to the younger generation the knowledge as well as the skills essential to the continued functioning of our society.
- Education has the function of cultural conservation. It has the responsibility to pass along the principles and foundations of cultural conservation. Essentialism is a conservative philosophy of education that expects change to come in an orderly fashion along the pathways that have already been laid.
- Schools are the means of maintaining the cultural structure of society. Schools have the duty to develop the certainty and trust to sustain the culture and society.
- Progressivism represents the quintessential philosophy of education for a democratic society. It believes in an underlying belief in each individual's ability to deal with the greater questions of the world.
- According to progressivists, knowledge is both social and individual- is the product of activity; education prepares people to engage in the decision making process of the community in an effective and desirable way.
- According to reconstructionism, the established institutions of society are no longer sufficient to deal with the problems.
- Social Reconstructionists assume that education has the power to educate people to analyse and understand social problems, envision a world in which those problems do not exist, and act so as to bring that vision into existence.
- Schools should teach the child not only to develop socially but also to participate in the social planning as well. Learners must see how society plays a critical role in evolving people. Learners must also be convinced of the validity and urgency of change.
- Secular education is advocated for- the development of moral outlook, the development of wider attitude and to make one dynamic, the development of pluralistic outlook, the development of democratic qualities like liberty, equality, fraternity, and cooperation, the promotion of cultural development and the development of scientific spirit.
- Science helps to improve life by resolving problems and plays a vital role in the progress and improvement of human life. Similarly, life is spiritual as well.
- Considering the postulates of different philosophies on education and curriculum, it can be concluded that a curriculum should be a reasonable one in terms of its subject matter and method of teaching.
- Psychology is the systematic scientific study of behaviour and the knowledge that results from that study. It studies the overt as well as covert behaviour. Psychology considers that all human functions are determined and carried out by some mental processes.

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- It is clear that curriculum should be flexible enough to allow its adaptation to the special needs of children. Teachers must view curriculum as a process of planning the best possible programme for children, parents and teachers.
- As per the considerations of psychology of education the following considerations were employed and experimented, in different countries over the globe, in order to incorporate the psychological basis of education in curriculum.
- What learning is, how learning takes place, and the characteristics of learners are to be considered while designing and developing curriculum.
- Different theories of development and learning are: (a) Socio-cultural theory (b) Multiple Intelligence Theory (c) Cognitive Development Theory (d) Behavioural Theory (e) Psychodynamic Theory (f) Maturational Theory (g) Field and Gestalt Theories (h) Humanistic Theory.
- Society and education are related to each other. The purpose of schooling is to serve the needs of the society. Similarly, society and its perceived demands form the bases for content selection for schools.
- Schools are part and parcel of society and exist for the development of the society. School influences society through its curriculum- the way and plan of teaching and learning and other activities.
- Society is increasingly becoming diverse, especially in urban areas. Societies are becoming more multicultural, multiethnic and multi-religious and it is important that curriculum understands and reflect these changes.
- Educators and policy planners should incorporate the learning experiences and content desirable enough to ensure the assimilation or integration of the diverse groups- assimilation of people of different cultural, ethnic and religious backgrounds.
- While designing curriculum, the supports of effective learning are to be taken into account.
- Educational technology is the efficient organization of any leaning system adapting or adopting methods, processes and products to serve identified educational goals.

2.7 KEY TERMS

- **Philosophy:** The critical analysis of essential suppositions or principles
- **Idealism:** The act or practice of imagining things in a perfect state.
- **Naturalism:** Naturalism is a type of philosophy which considers nature as the whole of reality.
- **Pragmatism:** Pragmatism is an attitude, a method, and a philosophy that employs the practical consequences of ideas and beliefs as a standard for determining value and truth.
- **Realism:** It is considered as a belief which looks upon the world as it seems to us, to be a mere phenomenon.
- **Existentialism:** It is an attempt to reach the inmost core of human existence in a concrete and individual fashion.

- **Perennialism:** Perennialism is a reactionary educational philosophy that would return the content of education to its very earlier roots.
- **Progressivism:** Progressivism is a philosophy that builds the seeds of revolutionary change into its very texture without suggesting what the change shall be.
- **Essentialism:** Is a conviction that things have a set of features which make them what they are. This conviction is based on the fact that essence is given preference to existence.
- **Reconstructionism:** Reconstructionists have a utopian view of a just society in which all the members contribute to the benefit of the group and thus to each other.
- **Secularism:** It is a belief that state, morals, and education should be independent of religion.

2.8 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Progressivism represents the quintessential philosophy of education for a democratic society. It believes in an underlying belief in each individual's ability to deal with the greater questions of the world.
2. Perennialism considers knowledge as eternal and it would bring the study of the great works of the past to centre stage.
3. Some of the characteristics of existentialism are:
   - Man is the centre of the universe and the basic feature of human personality represent his uncontrolled freedom
   - Existentialism gives emphasize on man's inner life and experiences
   - Freedom is the watchword in existentialism
   - It holds that action is the only thing that enables man to live
4. The forms of learning as stated by Gagne are: (i) Signal Learning (ii) Stimulus-response learning (iii) Motor chaining (iv) Verbal association (v) Multiple discrimination (vi) Concept learning (vii) Principle learning (viii) Problem solving learning.
5. Gardner proposed seven kinds of intelligences namely, linguistic, logical-mathematical, musical, bodily-kinesthetic, spatial, interpersonal and intrapersonal intelligences.
6. The major gestalt theorists are Kohler ad Wertheimer.
7. Locke advocated that learning should be made interesting. He believed in the Tabula Rosa theory where a student had a mind like a blank sheet with nothing printed on it at the beginning. With good teaching the mind would imprint positive things. The teacher then is a role model for students.
8. Pestalozzi stressed that schooling should be a joyous place to be in and humane methods of instruction should be used. Learning should be natural, not coercive. Rivalry and fear should not be used to motivate students to learn since each student has different talents and abilities.

2.9 QUESTIONS AND EXERCISES

Short-Answer Questions

1. In what way philosophy is related to education?
2. How does philosophy relate to curriculum construction?
3. How does psychology relate to education?
4. What are the major psychological aspects that we have to consider when we develop a curriculum?
5. What are the major social considerations of curriculum?
6. Write a short note on the historical foundation of education.

Long-Answer Questions

1. What are the philosophical considerations that a curriculum planner has to keep in mind?
2. Discuss various philosophies in terms of aims of education and methods of teaching.
3. Which philosophical approaches do suggest the innovative teaching methods?
4. Explain various theories of development and learning.
5. State the views of Locke and Pestalozzi on curriculum development.

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UNIT 3 PROCESS OF CURRICULUM DEVELOPMENT

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Structure

3.0 Introduction
3.1 Unit Objectives
3.2 Situation Analysis and Formation of Aims and Objectives
  3.2.1 Assessing Needs
  3.2.2 Formulating Objectives
  3.2.3 Selection of Content
3.3 Identification of Learning Experiences and Activities
3.4 Organization of Learning Experiences and Activities
3.5 Evaluation
  3.5.1 The Need for Evaluation
  3.5.2 Characteristics of Evaluative Instruments
  3.5.3 Importance of Curriculum Evaluation
  3.5.4 Sources of Curriculum Evaluation
  3.5.5 Methods of Curriculum Evaluation
  3.5.6 Evaluation during Curriculum Development
  3.5.7 Evaluation during Curriculum Implementation
3.6 Summary
3.7 Key Terms
3.8 Answers to 'Check Your Progress'
3.9 Questions and Exercises
3.10 Further Reading

3.0 INTRODUCTION

Curriculum Development process encompasses the design and development of integrated plans for learning, the design of implementation of the plans, and the evaluation of the plans, their implementation and the outcomes of the learning experience. Curriculum design is a process of critical questioning to frame learning and teaching. The main purpose of the process is to translate broad statements of intent into specific plans and actions. The intention is to ensure, as far as possible, alignment between the three states of curriculum—planned curriculum, the delivered curriculum and the experienced curriculum.

The fundamental purpose of curriculum development is to ensure that students receive integrated, coherent learning experiences that contribute towards their personal, academic and professional learning and development.

3.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Understand the principles of curriculum development
- Discuss the ideas of selection of content and selection of learning experiences

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- Describe the assessing needs and organization of learning experience
- Explain the need and importance of evaluation

3.2 SITUATION ANALYSIS AND FORMATION OF AIMS AND OBJECTIVES

In any process of curriculum development, contemporary thinking in education plays a very significant role. All over the world, curriculum is both a policy and a technical issue. It is both a process and a product. The process of developing a curriculum for any subject is unique to any national setting. 'It is a complex outcome of the opinions and solutions that key stakeholders propose for society's requirements and needs' (Innovations and Curriculum Development for Basic Education in Nigeria: Policy Priorities and Challenges of Practice and Implementation M.A. Ajibola Department of primary education Nigeria). There have been different processes adopted for designing the curriculum.

3.2.1 Assessing Needs

Teaching and learning have a definite purpose. We have to assess what is needed in order to carry out these activities in an unhindered manner. Major questions that help us decide about the educational needs are as follows:

- What part of the curriculum or course content does the topic fit?
- Why is the topic required?
- What are student requirements?
- What should be the outcome of the topic?
- Define the objective of the topic.

In simple terms, aim is purpose or intention of the desired outcome. It can also be understood as the starting point, a declaration of educational intention and director for the subject. To exchange a few words with students about what a topic is intended to do is a fine educational practice. When preparing declarations of aims, words play a significant role. The statement should be able to define the required characteristics of what the topic means to do.

Developing the topic description

Topic description involves the explanation of ideas and essential educational traits of a topic. This is usually not the first set of information that students may encounter. This influences the first impression that students get and can easily change enrolment decisions. The main question that arises in terms of topic description is: What is the relevance of the topic's elements in attaining the topic aim? This phase results to the creation of a detailed statement which defines the precise characteristics of the scope of the topic.

Detailed Topic Design

Detailed topic design states the common structural and administrative parameters of a topic. Students should be provided with the detailed design in the topic booklet and Statement of Assessment Methods (SAM).

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Students

Students are the focal point of any type of learning experience. Different students bring different learning experiences to any kind of learning environment. The character of the student association has significant effect on what is to be achieved in a topic of a particular size. Comprehensive design needs to keep in mind matters pertaining to educational setting, cultural variety and inclusive teaching.

With regards to student associations, the following questions need to be asked:

(i) What environment and level of knowledge are they required to bring to the topic concerning:
   (a) Academic skills, practices and conventions
   (b) Knowledge and culture of the discipline or field of study.
   (c) Cultural and behavioural knowledge

(ii) The pre-existing skills and knowledge required for a student to be successful in acquiring the intended learning result of the topic.

The probable entry competencies need to be made clear to future students, and if required, mechanisms should be put in place to help make those competencies.

3.2.2 Formulating Objectives

In everyday English, we have a tendency to use the terms aims, goals or objectives interchangeably. Within the educational lexicon, curriculum scholars, planners and administrators have been trying to regulate terms so that they refer to exceedingly specific components of a curriculum. The following definitions are generally accepted by groups trying to regulate curricular terms in order that they are not confusing to readers and users.

- **Aims**: These are common statements that offer direction or intention to educational deed. Aims are more often than not written in nebulous terms using words such as: learn, know, understand and appreciate. These are not straightforwardly measurable. Aims may serve as organizing doctrines of educational course for more than one grade. Indeed, these organizing doctrines may include the continuum of educational course for whole programmes, subject areas or the district. For example, students will appreciate and become capable at identifying the diverse types of spoken English.
- **Goals**: These are statements of educational intent which are more particular than aims. Goals too may encompass the whole programme, subject area, or manifold-grade levels. They may be in both nebulous language or in more particular behavioural terms. For example, students will be able to recognize and use Indian slang terms and phrases. (This example is a subset of the aforementioned aim, but the area [India] becomes more specific. The objectives related to this goal should specify how the students will identify and use new knowledge.)
- **Objectives**: These are more often than not specific statements of educational intent which define either general or specific outcomes. There are advantages and disadvantages to different kinds of objectives.
  - o Behavioural objectives
  - o Holistic objectives

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- o Non-behavioural objectives
- o Problem-solving objectives
- o Expressive activities that result in meaningful results

For example, objectives can be written in many ways. At present, most objectives are written in behavioural terms. Behavioural objectives commonly use observable verbiage and can be divided into explicit domains — cognitive, affective and physical.

Samples

- **Cognitive:** Students will recognize and list five slang terms they have heard from their peers.
- **Affective:** Student will select three of the most offensive slang terms from a list developed by the whole class.
- **Physical:** Students will create communicative gestures to go with their favourite slang terms.

3.2.3 Selection of Content

Content is defined as the subject or topics that are covered in a book or a document. Content is more than simple knowledge and therefore selecting proper content requires achieving a fine balance between subject knowledge, process skills and the growth of a student as a learner. While selecting content it is also essential to specify context. The following questions need to be kept in mind during the selection of content:

- What type of knowledge (ideas, concepts, interpretations and application) should be added to enhance student learning to attain intended learning results?
- By the end of the topic discussion, what process knowledge and skills should the student acquire?
- At the end of the topic, what context in the discipline should the students achieve?
- What is the correct balance of content in terms of knowledge/skills, processes/ values and depth/breadth?
- How can global perspectives be included in the topic?

Once the content has been finalized, it is essential to organize the content in terms of scope and sequence. When deciding the scope of the content, time is considered to be a key factor. Time is also relevant in confirming the balance between breadth and depth. Integration is also a significant factor pertaining to scope. It has been seen that students learn more when they are able to connect new content with previous knowledge. Students understand better when they are able to apply their knowledge in real-life situations. Content selection is considered to be incomplete when as much as possible has been put in, but rather when so far as possible has been taken out without compromising the reliability of the topic as a learning experience towards the planned learning results.

3.3 IDENTIFICATION OF LEARNING EXPERIENCES AND ACTIVITIES

It is important that detailed deliberation of learning and teaching interaction are in line with educational objectives and proposed learning results for the topic. Teaching should

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convey and represent the values that are expected in the end in order to assist and enhance learning.

The following basic questions need to be answered when selecting a learning experience:

- What method will contribute to achieve the main objective of the topic? For instance, should one use problem-based learning, work-integrated learning (WIL) or group-based learning?
- How can teaching be applied to attain student learning in terms of the projected learning results?

While selecting a teaching method along with learning-teaching interactions, the following factors need to be kept in mind:

- Aptness for the learners and comprehensive teaching
- Resources required to facilitate and sustain student learning, for instance, text books.

There are a number of strategies that can help to enhance greater learning for students. It has been observed that students are bound to study more when:

- They are more enthusiastic and energetically involved in education
- Awareness regarding their preference of learning
- They are able to apply their learning in real-life situations
- Working effectively on a regular basis with staff and other students

3.4 ORGANIZATION OF LEARNING EXPERIENCES AND ACTIVITIES

In simple terms learning outcomes may be defined as the features and abilities that a student should possess on completion of a topic. The main purpose of learning objectives is to evaluate progress and prepare evaluation strategies and methods for future use. Learning outcomes are seen as signposts with respect to suitable content and learning interactions in order to assist students to achieve results.

The main questions that are required to be asked with respect to the results of intended learning are as follows:

(i) What is the expected result of the student's learning experience in the following areas:
   (a) Discipline
   (b) Awareness
   (c) Application of knowledge
   (d) Course competencies including basic skills
   (e) Student development at the beginner's level

(ii) What is the correct balance across the intended result?
   (a) Words, in particular verbs, matter when it comes to developing and recording proposed outcomes.
   (b) Learning outcomes are the abilities that a student should possess on completion of a topic.

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CHECK YOUR PROGRESS

1. What is the need of a 'detailed topic design'?
2. What are the 'aims' in the context of curriculum designing?
3. What happens once the content is selected?

3.5 EVALUATION

Evaluation is an indispensable component of curriculum planning and the advancement process. We can give a broad definition of curriculum evaluation as a process of delineating, obtaining and providing information that is useful for making decisions about curriculum development and implementation.

On Curriculum development in education, two aspects of evaluation are mentioned as part of the process of curriculum development. The students of education need to understand the purposes of evaluation, and how the evaluation can be done. Modern trends in formal education have made the evaluation highly complex, both in its purpose and use. Today a teacher in a college is required to know why a particular evaluative instrument should be used, as also how that particular instrument could be made, used, and how the results could be interpreted. At times the evaluative instruments are not properly made by the teachers, or the instruments, if properly made, are not used correctly and, therefore, they do not give reliable results. To prevent such mistakes the knowledge of evaluation is absolutely essential for every student who aspires to be a teacher. Evaluation has become a major concept in education now; and the need and the functions of evaluation, as also the characteristics and types of selected evaluative instruments have to be properly understood.

3.5.1 The Need for Evaluation

Three different dimensions of evaluation are depicted through the modern concept of evaluation and are as follows:

(i) The attempt to evaluate a wide range of behavioural objectives instead of mere knowledge regarding the subject matter.

(ii) A number of evaluating instruments are put to use depending upon requirement, availability and application of the instrument along with the skills of a teacher in using them. Tests, questionnaires and interviews are some of the instruments used in evaluation

(iii) The process of evaluation involves the integration and interpretation of different behavioural aspects into a whole, or into an inclusive picture of a student, or of a class of students as may be required.

Evaluation is therefore the measurement of selected knowledge, skills, attitudes and values for finding behavioural changes in the students. As Wrightstone mentions, evaluation emphasizes broad personality changes and involves three broad steps:

- Identifying and formulating objectives

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- Defining these objectives in terms of behaviour to be realized by the students
- Selecting or making valid, reliable, and practical instruments to assess the behaviour of the students

The major purposes of evaluation can be summarized as follows:

1. To check the effectiveness of teaching programmes.
2. To check the effectiveness of the educational institution as a whole.
3. To assess the progress of the students.
4. To select students for higher courses, specialization at under graduate and post-graduate levels, and for jobs.
5. To indicate points and levels of improvement.
6. To validate and verify the hypotheses upon which the teacher base their teaching and evaluation of students.
7. To guide the students in removing their weaknesses as reflected in the evaluation.
8. To provide certain psychological security to the school staff, students, parents of the students, and the community at large.
9. To help both teachers and students to see their objectives.
10. To help teachers to improve, or change, their methods of teaching and evaluation.

3.5.2 Characteristics of Evaluative Instruments

The characteristics of an effective evaluative instrument are, in general, its adequacy, efficiency, and consistency. These three characteristics are depended upon the qualities called validity, reliability, objectivity, norms, and practicability

Evaluation of curriculum

Cronbach (1963; 673) distinguishes three types of decisions for which evaluation is used:

1. **Course improvement**: Deciding what instructional material and methods are satisfactory and where change is needed.
2. **Decisions about individuals**: Identifying the needs of the students for the sake of planning instructions, judging merit of the students for the purposes of selection and grouping, acquainting the students with their own progress and deficiencies.
3. **Administrative regulation:** Judging how good the school system is, how good individual teachers are, etc.

In measurement-based evaluation, it is argued, the function of objectives is to make it possible to develop criterion-referenced, rather than norm-referenced, tests. Norm-referenced tests show how an individual performs as compared with a group. Criterion-referenced tests tell us about an individual's performance in relation to a standard.

A teacher or a curriculum developer is invited to nominate by stating his/her objectives, the standard by which they wish their work to be assessed, provided that the standard is couched in behavioural terms which make it possible to develop criterion-referenced tests.

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They can opt for how the curriculum is to be measured but not for how it is to be judged. They cannot, for example ask how it is to be judged. It is to be judged in the light of measurement of the performance of students on criterion-referenced tests.

Glaser (1970) has distinguished six different educational needs and has suggested the considerations for evaluation and measurement.

1. With respect to the specification of learning outcomes, the following are required.
   - Behavioural definition of goals, evaluation progress toward these goals, and clarifying these goals in the light of evaluated experience
   - Prior evaluation of educational procedures, insuring they are in effect before assessing educational accomplishment
   - Development of techniques for criterion referenced measurement
2. The requirement for the determination of long-term individual differences related to adaptive educational alternatives of initial state.
3. For the design of instructional alternatives a key task is to be determined to measure the highest discriminating potential for allocating between instructional treatments.
4. For continuous assessment discovery of measurements of ongoing learning that facilitate prediction of the next instructional step is required.
5. For adaptation and optimisation, the instructional model requires (a) the detailed analysis of individual–difference by instructional treatment interactions, and (b) the development of procedures like the optimising methods.
6. For evolutionary operation, we require a systematic theory or model of instruction into which accumulated knowledge can be placed and then empirically tested and improved.

What happens if the curriculum for a particular grade is not revised for a long time? Almost any one of you can guess the answer. It would become obsolete, recent developments in the field will not find a place in it and it will not be effective and efficient. In order to develop an efficient and effective curriculum what should we do? We should evaluate the existing curriculum and modify it to make it more relevant. Thus the need for evaluating a curriculum emerges from the field. In any content area there would be developments taking place periodically and if the current changes are not incorporated, the students would be unable to know the reality. In order to incorporate recent developments and to fit them into the structure of the course one requires analysing curriculum systematically. This scientific analysis if followed logically leads to curriculum evaluation.

A curriculum evaluation exercise would help us modify curriculum and improve its effectiveness. To improve the efficiency of a curriculum one has to analyse the outputs and the inputs into educational system and make the necessary modifications as revealed by the analysis. This can be accomplished by conducting curriculum evaluation.

There could be differences between the intended curriculum and the operational curriculum. Intended curriculum refers to the prescriptions in the curriculum document including the operational and evaluation procedures of a course. The operational curriculum refers to the actual processes in a classroom through which the intended curriculum is transacted. There could be differences between what is intended and what is implemented. To reduce this gap and bring it to a reasonable level of acceptance, curriculum evaluation would again be helpful.

3.5.3 Importance of Curriculum Evaluation

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The following are the main purposes of curriculum evaluation

- **To develop a new curriculum:** To make objective decisions on the development of the new curriculum, evaluation of the existing curriculum is necessary.
- **To review a curriculum under implementation:** It may be required by policy planners and decision makers to get an immediate feedback on the implementation of a curriculum in order to make amendments if required for effective realization of all the objectives related to it. A curriculum evaluation exercise would be necessary for this purpose.
- **To review a curriculum under implementation:** It may be required by policy planners and decision makers to get an immediate feedback on the implementation of a curriculum in order to make amendments if required for effective realisation of all the objectives related to it. A curriculum evaluation exercise would be necessary for this purpose.
- **To remove 'dead wood' and update an existing curriculum:** It is essential to remove obsolete ideas and practices from a curriculum and include current development in the curriculum. In order to make objective decisions about inclusion or deletion of content or practices a curriculum evaluation exercise would again be necessary.
- **To find out the effectiveness of a curriculum:** To make an objective evaluation of the effectiveness of a curriculum in terms of the achievement of its immediate as well as long-term objectives, a curriculum evaluation exercise would be essential. This evaluation is different from the evaluation of the students of a course for the purpose of certification. The difference is that curriculum evaluation is more comprehensive and includes student evaluation plus the feelings generated among the students regarding appropriateness of the various components of the curriculum.

3.5.4 Sources of Curriculum Evaluation

Students: The students of a particular course are the primary and most important source of information regarding how relevant the intended curriculum is and how well it is being implemented. The list of the output specifications can be given to the students who are undergoing a particular course and detailed information can be gathered in two ways.

- By finding out whether the students have really achieved the intended output specifications. They feel they have achieved the objectives of the course. Information is generally gathered through the evaluation system as prescribed in the curriculum for certification purpose and is mostly quantitative in nature.
- By finding out the perceptions of students regarding the extent to which they feel they have achieved the objectives of the course. This information is more qualitative in nature as these are the perceptions of students and they are of immense value from the point of view of revising the curriculum.

Teachers: Curriculum review/evaluation should be done by the teachers in the school. However the involvement of others cannot be denied. The teachers are part of the

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curriculum in the sense that they transact the curriculum in the class. They can give valuable information regarding the implementation of the curriculum. The teachers are valuable agents of curriculum evaluation. Teachers who are not currently teaching the subject but have sufficient content knowledge and background information on a particular curriculum can also be helpful in curriculum evaluation in addition to those teachers who are currently implementing the curriculum.

Subject experts: To get balanced information on the implementation of a curriculum, especially from the disciplinal point of view, it would be worthwhile to consider the views of other subject experts in the field as relevant and reliable. The subject experts could be from other systems like a practitioner in the field or even a self-employed person. The experts will provide valuable information on the field conditions which would be of tremendous value for the purpose of curriculum evaluation.

Curriculum experts: Curriculum experts can provide information on the modern techniques used for developing a curriculum so that it becomes more meaningful from the student's point of view. In the meaningful curriculum the output specifications are made clear, the conditions under which they will be observed and the level of acceptance of errors.

Policy Makers: Policy makers occupying responsible positions in apex bodies like Central Board of Secondary Education (CBSE), National Council of Educational Research & Training (NCERT), National Open School (NOS) and State Boards of Secondary Education are also excellent sources of information for curriculum evaluation. By virtue of their position they are better informed about the current and envisaged changes in government policies regarding economy, industry, agriculture and education. All these areas have direct or indirect implications for school curriculum.

Community: The local community where the products (educated/trained persons) of a particular course are to be absorbed can be yet another important source of information for curriculum evaluation. The requirements of the local community can make the curriculum relevant and need-based. A curriculum revised on the basis of needs and requirements of the community will be able to serve the cause of the community better in producing better socialized and more responsible citizens.

Dropout sample: Those students who have dropped out of a particular course can be yet another valuable source of information for curriculum evaluation. These students can pin-point the curricular factor that might have been responsible for their withdrawal from the course.

Employers and entrepreneurs: The opinion of the employers, who have to absorb the products needed by them, will reflect on the strengths and weaknesses of the curriculum. Those who are self-employed, even in the unorganized service sector can provide valuable information on the strengths and weaknesses of a particular curriculum.

3.5.5 Methods of Curriculum Evaluation

Curriculum evaluation can be done by an external agency or by insiders (those who are involved in the planning and development of the curriculum or by a combination of both the groups). A combination of outsiders and insiders would be preferable to get a comprehensive and objective evaluation. The methods of evaluation vary from a

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questionnaire based evaluation to evaluation based on unstructured interview. The method of collecting information would depend on the objective of evaluation. When we require more qualitative descriptions of the implementation of the curriculum, unstructured or structured observations can be used. When we require quantitative data regarding various aspects of a curriculum being designed, a check-list can also be used. Similarly many other techniques can be used depending on the purpose of evaluation and the stage of evaluation i.e., whether evaluation is being done at the development stage or at the implementation stage. Curriculum evaluation at the planning stage is mostly confined to job analysis or task analysis. Similarly the content analysis that follows also required the support of formative evaluation. These exercises are usually not practiced in schools and so the curriculum suffers from several drawbacks. A well prepared school curriculum should accommodate an evaluation cycle at the planning stage also.

3.5.6 Evaluation during Curriculum Development

One of the major tasks during the development of a curriculum is to prepare an exhaustive list of specific objectives to be achieved through the curriculum. Once the list is prepared, it has to undergo an evaluation cycle. The list may be supplied to a set of practicing teachers for their specific comments, additions and deletions, if any. In addition to working teachers, information from other individuals like prospective employers of the products, the next higher grade teachers, a group of prospective students, planners and administrators can be given to check whether the entry behaviour of their grade suits the output specifications. Based on the feedback collected from the evaluators the objectives can be modified.

A second major task which requires the support of an evaluation exercise during the development of a curriculum is the instructional materials that have been prepared to achieve the objectives. These materials have to be tried out on a sample of students for their feedback on their learning routes and difficulties. A field tryout with a small sample is ideal in getting adequate evaluation information from a sample. This can be used for further improvement of the material. Data collected from the inbuilt evaluation of the learning material can also be used in modifying the learning material. Curriculum material here refers to all learning materials which included textbooks, self-learning text, audio and video programmes, teacher's manual, assignment questions, project work, etc. Similarly, the evaluation procedures to be adopted during curriculum development also need a tryout and possibly further modification based on data collected through the tryout.

3.5.7 Evaluation during Curriculum Implementation

After the curriculum has been tested and the curriculum materials are duly modified, it is important that the teachers and administrators are oriented and trained for proper implementation of curriculum. To implement curriculum without introductory or supporting courses would be quite a severe risk; it may lead to the use of new materials in unsatisfactory ways. Training of the personnel involved and the provisions of all necessary facilities and resources are essential for successful implementation of any curriculum.

Evaluation is necessary at the time when curriculum is implemented as well as after each offering of the course. The purpose of evaluation at this stage is two-fold (a)

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to find out the areas of support needed for effective implementation of the curriculum in schools; and (b) to control the quality of the product i.e. the educated person. Important information to be collected at this stage includes.

The existing situation: All aspects of curriculum according to the curriculum plan need to be studied in order to identify the missing features of the curriculum being implemented in the schools. A checklist which gives all the features of the objectives and the content of the curriculum, students' characteristics necessary to begin the teaching-learning process, teachers' characteristics necessary for implementing the curriculum, basic assumptions regarding how teaching and learning should take place to ensure active participation of the students, additional materials required to implement the curriculum, organization of the curriculum with respect to time requirements and the order in which the activities and the materials are to be processed, methods of implementation of the curriculum and evaluation of student's performance can be used to assess the discrepancies or the gaps in the implementation of different aspects of curriculum.

Effectiveness of the curriculum: The crucial question is that determining the effectiveness of curriculum is to determine the extent to which the students attain the standards or achieve the objectives as described in curriculum planning. Thus the effectiveness of curriculum reveals whether curriculum is able to achieve objectives set by the social system.

Acceptability of the programme: In addition to assessing the effectiveness of the curriculum it is also important to assess its acceptability. Acceptability here means whether the people involved in implementing the programme like it or not. To get an insight into the acceptability of the programme, the perceptions of students, teachers and the supervisors/ administrators of the school should be ascertained.

Check Your Progress

4. What are the dimensions of evaluation?
5. Name the different sources of curriculum.

3.6 SUMMARY

- In any process of curriculum development, contemporary thinking in education plays a very significant role.
- To exchange a few words with students about what a topic is intended to do is fine educational practice.
- Aims may serve as organizing doctrines of educational course for more than one grade.
- Goals may encompass the whole programme, subject area, or manifold-grade levels. They may be in both nebulous language or in more particular behavioural terms.
- Content selection requires offering suitable balance to subject knowledge, process skills and the growth of the student as learner as well as to specify and context.

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- Evaluation is an indispensable component of curriculum planning and the advancement process.
- Evaluation has become a major concept in education now; and the need and the functions of evaluation, as also the characteristics and types of selected evaluative instruments have to be properly understood.
- The evaluation attempts to measure a widespread range of behavioural objectives rather than the meagre knowledge of subject-matter.
- In modern evaluation, a variety of evaluative instruments are used depending upon their availability and applicability of the instruments and the skill of the teacher in using them. Some of these instruments are tests, essays questionnaires, and interviews.
- The evaluation includes integrating and interpreting various aspects of behaviours into a whole, or into an inclusive picture of a student, or of a class of students, as may be required.
- The characteristics of an effective evaluative instrument are, in general, its adequacy, efficiency, and consistency. These three characteristics are depended upon the qualities called validity, reliability, objectivity, norms, and practicability
- One of the major tasks during the development of a curriculum is to prepare an exhaustive list of specific objectives to be achieved through the curriculum.
- A second major task which requires the support of an evaluation exercise during the development of a curriculum is the instructional materials that have been prepared to achieve the objectives.
- After the curriculum has been tested and the curriculum materials are duly modified, it is important that the teachers and administrators are oriented and trained for proper implementation of curriculum.
- Evaluation is necessary at the time when curriculum is implemented as well as after each offering of the course. The purpose of evaluation at this stage is two-fold (a) to find out the areas of support needed for effective implementation of the curriculum in schools; and (b) to control the quality of the product i.e. the educated person. Important information to be collected at this stage includes.

3.7 KEY TERMS

- **Cognitive:** Pertains to the mental processes of perception, memory, judgment, and reasoning, as contrasted with emotional and volitional processes.
- **Evaluation:** To examine and judge carefully or appraise.
- **Holistic:** Emphasizing the importance of the whole and the interdependence of its parts.

3.8 ANSWERS TO 'CHECK YOUR PROGRESS'

1. The 'detailed topic design' is needed to provide common structural and administrative parameters of what comprises a topic, to the students.

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2. With regard to curriculum designing, the term 'aims' refers to the common statements that offer direction or intention to educational deed. Aims are more often than not written in nebulous terms using words such as: learn, know, understand and appreciate.
3. Once content has been chosen, it requires to be organized corresponding to two main principles: scope and sequence.
4. The modern concept of evaluation denotes at least three different dimensions of evaluation:
   - The evaluation attempts to measure a widespread range of behavioural objectives rather than the meagre knowledge of subject-matter.
   - In modern evaluation, a variety of evaluative instruments are used depending upon their availability and applicability of the instruments and the skill of the teacher in using them. Some of these instruments are tests, essays questionnaires, and interviews.
   - The evaluation includes integrating and interpreting various aspects of behaviours into a whole, or into an inclusive picture of a student, or of a class of students, as may be required.
5. The sources of curriculum evaluation are students, teachers, subject experts, policy makers, community drop out sample, employers and entrepreneurs.

3.9 QUESTIONS AND EXERCISES

Short-Answer Questions

1. Define the term 'curriculum design'.
2. How is the 'topic description' developed?
3. Differentiate between 'goals' and 'objectives' in the context of curriculum development.
4. What is meant by the organization of learning experiences?
5. Write a short note on evaluation.

Long-Answer Questions

1. Discuss the processes of selection of content and selection of learning experiences.
2. Write in detail the process of curriculum development.
3. Explain the importance of evaluation in the process of curriculum development.
4. Write a short note on the role that evaluation plays in curriculum development.
5. Write in detail the different methods of curriculum evaluation.

3.10 FURTHER READING

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UNIT 4 CURRICULUM DESIGN

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Structure

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4.1 Unit Objectives
4.2 Sources of Curriculum Design
  4.2.1 Attributes of Curriculum Design
  4.2.2 Four Stages of Curriculum Design
  4.2.3 Different Sources of Curriculum Design
4.3 Types of Curriculum Design
  4.3.1 Subject-centered Curriculum
  4.3.2 Learner-centred Curriculum
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  4.3.5 Experience-cum-Activity-centred Curriculum
  4.3.6 Balanced/Coherent Curriculum
  4.3.7 Fused Curriculum
  4.3.8 Co-related Curriculum
  4.3.9 Horizontal and Vertical Design
4.4 National Curriculum Framework for Secondary Education-2005
4.5 National Curriculum Framework for Secondary Education- 2009
4.6 Summary
4.7 Key Terms
4.8 Answers to 'Check Your Progress'
4.9 Questions and Exercises
4.10 Further Reading

4.0 INTRODUCTION

The concept of curriculum is an oft debated issue. Each student recognizes content and concepts diversely based on their previous experiences. Yet efficient classroom learning needs more than just linking new material with old ways thinking; it involves new ways of understanding. Students require knowledge that helps them build up new views and make better sense of the world. Learning is the task of the learner but the teacher directs the student towards developing meaning from content and classroom experiences. Only when the student has developed the ability to successfully explain a body of knowledge to others can it be said that the knowledge has been mastered. The textbook is a classroom resource, but not the only resource. True knowledge should incorporate different point of views that includes textbooks, Internet, multimedia and other sources of information. Curriculum is all encompassing and above all it is learner focussed.

4.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Discuss the different sources of curriculum design
- Describe the advantages and disadvantages of the various types of curriculum
- Discuss the National Curriculum Framework for Secondary Education-2005

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4.2 SOURCES OF CURRICULUM DESIGN

Definition of Curriculum Design

According to Taba (1962), 'Curriculum design is a statement which identifies the elements of the curriculum, states what their relationships are to each other, and indicates the principles of organization and the requirements of that organization for the administrative conditions under which it is to operate. A design, of course, needs to be supported with and to make explicit a curriculum theory which establishes the sources to consider and the principles to apply.'

In simple terms, curriculum design refers to the ways in which the curriculum component is put together. Curriculum design can also be understood as the architecture of a course study that integrates a philosophy of learning and teaching, Curriculum design is the architecture of a course of study that embodies a philosophy of learning and teaching, articulates a clear set of desired learning outcomes and describes how the planned learning environment will support the student to achieve those learning outcomes. Courses are organized in an arrangement of units, which may incorporate required, sequenced and optional elements. Curriculum design is an integral part the educational system focusing on creating curricula for students.

4.2.1 Attributes of Curriculum Design

Curriculum design is an aspect of the education profession that focuses on developing curricula for students. Curricula designing is similar to designing any object, method or system in vital respects. On this basis, it is said to have the following attributes:

(i) **Curriculum design is focused and purposeful:** The main function of curriculum design is not limited to creating a study course. Curriculum design also involves the development of student learning. Besides this, it also serves other purposes which differ in nature. They may be explicit or implied, instantaneous or long range, political or technical, etc. irrespective of their nature or whether they are in agreement or disagreement, the curriculum designers main aim to make the curriculum as clear as possible.

(ii) **Curriculum design is intentional:** For any curriculum design to be effective, planning is the key. Designing cannot be accounted in terms of the diverse changes that have been brought over a period of time. Designing a curriculum involves an explicit process that includes what will be done, by whom and when.

(iii) **Curriculum design is creative phenomena:** There is no set procedure that is followed to design a curriculum. Curriculum designing includes new ideas and fresh concepts at every stage of curriculum design. Good curriculum design is systematic and creative.

(iv) **Curriculum design operatives on many levels:** It very imperative that decisions taken at a certain level are in tandem with decisions taken at other levels. For instance, a curriculum design created for middle school is mismatched with elementary and high school designs will result in a defective K-12 curriculum irrespective of the fact that each part individually is prepared excellently. Similarly, a middle school curriculum cannot be effective on its own unless the designs of its grades are in accordance to it.

(v) **Curriculum design requires some adjustments and compromises:** The aim of curriculum design is not to reach the perfection but the challenge is to come up with a curriculum that functions well. While creating a design that meets multifaceted specifications, trade-offs inevitably have to be made keeping in mind the benefits, costs, constraints and risks. No matter how systematic or inventive the planning is, curriculum designs may not turn out the way that everyone would want.

(vi) **Curriculum designs can fail:** There may be numerous ways in which curriculum designs may fail to operate successfully. A design may end in failure if one or more components of the curriculum design do not function as desired or if the components do not work well together. On many occasions, people who are required to follow the curriculum may not understand the design. This misunderstanding may lead to the rejection of the design. Curriculum designs are neither wholly satisfactory nor abject failures. Indeed, a key element in curriculum design is to provide for continuous correction and improvement, even during the design process and also afterwards.

4.2.2 Four Stages of Curriculum Design

Curriculum design is a methodical way of going about planning instruction, even though there is no hard and fast rule to follow some inflexible set of steps. Curriculum decisions that are made at one stage necessarily do not depend on decisions made at other stages, and that the curriculum-design process tends to be iterative, so it is always likely that different stages being crossed can return for reassessment and possible amendment. But recognizing the different tasks and problems at each stage is important in making the process work. The stages are:

1. Establishing curriculum-design specifications (i.e. we should know the motive of initiating instruction or aims)
2. Conceptualizing a curriculum design (It should be clear what content or subject matter is to be taught to realize our set aims and objectives)
3. Developing a curriculum design (The way of communicating target learning experiences i.e. pedagogy, instruction)
4. Refining a curriculum design (What has been realized and what measures are taken accordingly in relation to the instructional program, learners, and teachers (evaluation).

Most of the curriculum designs comprise these four components but they may significantly differ in how they address these elements due to different curriculum philosophy and model on which a design is based.

4.2.3 Different Sources of Curriculum Design

- Knowledge
- Learner

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- Science
- Society
- External and divine sources

Knowledge as a Source

- It is one of the prime sources of curriculum
- There are two kind of knowledge-
  - o *Disciplined knowledge* that has a particular constitution, structure and a particular method which can be used to extend its boundaries
  - o *Undisciplined knowledge* does not have exclusive content but pulls from many sources

For example, Physics has a conceptual structure but home economics is undisciplined in nature which means that its content is not unique to itself but is drawn from a variety of other disciplines and tailored for a special focus

Learner as a Source

- The progressive and flexible curricularists, humanistic educators, and those engaged in *postmodern* dialogue consider the learner to be the primary source of curriculum design.
- The source of curriculum origin is from what we know about the learner and emphasis is on 'learning by doing.'
- This basis is focused on the societal foundation and restoration of knowledge and the empowerment of individuals to be engaged in these processes.

Science as source

- The scientific method provides meaning for the curriculum design. The curricula emphasizes on scientific procedures.
- This design stresses on learning that focuses on how to learn or 'think'.
- Only those items that can be observed and quantified should be included.
- Problem solving should have the prime position in the curriculum.
- This view coincides with the scientific and rational world of Western culture.

Society as source

- The institutions and schools are the agents of society thus the curriculum taught in schools provide the idea that in turn is drawn from the analysis of the social situations.
- Serves the broad social interests of society as well as the local community.
- Society shows where to modify the curriculum.
- The challenge is how to address the unique needs of students and demands of diverse social groups and still allow students to gain understanding of the common culture, as well as common, agreed on competencies to engage productively in society.

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External and Divine Sources

- Curriculum design should be intended to perpetuate society.
- It should pass on the significance of values and personal morality.
- Includes divine will, eternal truth from religious documents.
- Has little influence in public schools primarily due to the mandated separation of religious institutions and state. However, to many private and parochial schools, this source of curriculum is still valid and has a major influence.

Check Your Progress

1. Name the different sources of curriculum designs.
2. How does curriculum design operate on different levels?

4.3 TYPES OF CURRICULUM DESIGN

In formal education, a curriculum is the set of courses, and content that is offered at a school or university. It is prescriptive, and is based on a more general syllabus that merely specifies what topics should be understood and at what level to achieve a specific grade or standard.

- **Scope:** Breadth and depth of curriculum content
- **Sequence:** Vertical relationship among curricular areas
- **Continuity:** Vertical management or replication of the curriculum components
- **Integration:** Connects types of knowledge and experiences enclosed within the curriculum plan
- **Articulation:** Relationship or association between elements of curriculum
- **Balance:** Giving appropriate weight to each aspect of the design

4.3.1 Subject-centered Curriculum

Dr. Bagley, late professor at Columbia University in New York City, advocated implementation of a subject-centered curriculum. According to him subject matter taught should echo basic essential learning for all pupils. He stated that this meant steadiness and should therefore be adopted.

William Chandler Bagley felt that the subject curriculum gave stability to the subjects taught. Once essential content is identified this becomes the core values on which the curriculum must be based. These core values set standards and these standards become the criteria for setting the academic and social expectations of schools.

This approach has a 'subject-centered' orientation. Students attain mastery of subject matter that is pre-determined by a set of 'experts.' Curriculum is systematized around content units and the sequence of what is taught pursues the logic of the subject matter. Usually the school is the holder of power in decision making regarding the following:

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- What gets taught?
- What educational purposes should the school seek to attain?
- How can learning experiences be selected that are likely to be useful in attaining these objectives?
- How can learning experiences be organized for effective instruction?
- How can the effectiveness of learning experiences be evaluated?'

Curriculum is a cumulative process and the experiences in the school exert its influences on the learner like the ways water dripping on a stone wears it away. Knowledge and skills are not duplicated, but instead, are taught sequentially over time. Skills-based or competency-based instruction draws upon a traditionalist approach to curriculum, with students mastering a particular set of skills or processes in a logical instructional progression.

Advantages of subject-centered curriculum

Advantages of subject-centered curriculum are as follows:

- It has traditional approach, which is liked by students as they are used to it and it fits in their idea of what a school should be.
- Learning distinct skills in a step-by-step process leads to traditional testing.
- Test scores can be effortlessly quantified and explained to funders as program outputs.
- Program administrators can use the results of traditional tests to validate their program's accomplishments.
- Whatever the students learn, they learn well.
- They do not have to wait for a class to start or fit it in their timetables, particularly in case of adult learners.

Disadvantages of subject-centered curriculum

Disadvantages of subject-centered curriculum are as follows:

- Learners spend time learning what is in the text instead of learning to think for them.
- The information is partitioned; where it should be included in other studies.

4.3.2 Learner-centred Curriculum

Student-centred learning also known as child-centred learning is an approach of education. It focusses on the requirement of students, rather than of others involved in the educational process like teachers and administrators.

Implications of learner-centred curriculum

- The curriculum is focussed on the needs of students and so the subject taught would be geared to the specific requirements of the students.
- It is focussed on student needs, abilities, interests and learning styles with the teacher as a facilitator.
- Students are also responsible for their own learning.

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- Students participate in discovery learning processes.
- Students construct new knowledge and are proactive.
- Hands on activities are designed to facilitate student learning.
- Students are able to achieve life long learning goals, which enhance motivation and acts as an incentive to learning.
- Students learn tc reflect on their work and so develop self-regulatory practices.
- Students are involved in knowledge production and not just rote learning.
- The multiple intelligence theory that studies student learning styles is very much a part of this method.

Advantages of learner-centred curriculum

The advantages of learner-centred curriculum are as follows:

- It strengthens student motivation.
- It promotes peer communication.
- It reduces disruptive behaviour.
- It builds student–teacher relationships.
- It promotes discovery/active learning.

This approach has changed the educator's methods and the way student's learning is innovative and is to a large extent also impacted by the teacher's mind set. When a teacher allows his student to make enquiries; he sets the stage for his academic success. Successful learning takes place when the students are fully engaged. The teacher's goal is to make new interpretations of the learning material. This is closely related to James Henderson's three basic principles of democratic living, which are as follows:

- **Subject learning:** Students learn better if the subject matter is thoughtfully presented.
- **Self-learning:** One should engage himself in the generative process.
- **Social learning:** Social interaction with various groups develops generosity.

According to V.Y. Gotsky 'Learning is oriented towards developmental level that have already been reached. It is ineffective from the view point of the child's overall development as it does not aim for a new stage of developmental process but rather lags behind this process.' In short, instruction is planned to access a developmental level, which is measurable to the student's current stage in development.

Disadvantages of student-centred curriculum

- **Cannot help everyone:** There are some extremes like the intellectually handicapped, or those impaired in a certain area e.g. dyslexia or those who are severely gifted, e.g. who can read Shakespeare at the age of three cannot be helped via student-centered curriculum.
- **The Internet as a classroom and community:** Usage of Internet without supervision is not healthy. Discovering useful links to areas of interest through search engines is usually, but not always a useful thing to do. It entails to be supervised.

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- **Thoughts about discipline:** The concept of discipline is not as prominent in student-centered curriculum as it should be; because the basic aim of discipline is to gradually teach children to internalize it.

4.3.3 Undifferentiated and Differentiated

Differentiated approaches to curriculum development

When there are several stages in an outcome-based curriculum development, it is characterized as being differentiated. This type of curriculum development can be witnessed in countries that follow the IVET (Initial Vocational Education and Training) programmes in mainstream institutions and are closely associated with general education to a certain extent. This suggests that IVET curriculum is inclusive of general or academic knowledge, although the level needed may be lower than that of the entire academic programmes. For example, Sweden, where the IVET programme is a part of the national curriculum.

Undifferentiated approaches to curriculum development

In the undifferentiated approach, there are a few recognizable changes during curriculum development. The undifferentiated approach deals with curricula that serve different programmes which basically cater to learners who have already completed national curriculum. These programmes mainly emphasize on vocational learning that includes a small component of generic skills. General or academic knowledge is usually absent in these programmes. The programmes have a work-based character. The training programmes provided under the undifferentiated approach are not a part of upper secondary schools that also provide general education. These training programmes are conducted in special upper secondary vocational schools or post secondary institutions. This can be seen in United Kingdom at the NVQ Level 3 curriculums for travel services and in Ireland for professional cooking traineeship where the entire structuring of the design process is simple and undifferentiated.

In an undifferentiated classroom instruction only student similarities takes the core stage. In a differentiated classroom, commonalities are acknowledged and teaching and learning is built upon student differences.

At its most fundamental level, differentiating instruction means 'shaking up' what goes on in the classroom so that students have numerous options for captivating information, making common sense of ideas, and expressing what they learn. In simple words, a differentiated classroom provides different avenues for acquiring content, processing or making sense of ideas to develop products.

Curriculum differentiation

Gifted students work through the curriculum at a quicker pace and requires less time on the basics and revision. Thus a differentiated curriculum is a programme of actions that offers a range of entry points for students who are at variance in abilities, knowledge and skills. In a differentiated curriculum teachers offer diverse approaches to *what students learn* (content), *how students learn* (process) and *how students demonstrate what they have learnt* (product).

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- **Differentiated instruction is Student-Centered:** Learning experiences are considered to be most effectual when they are engaging, applicable, and interesting. But all learners do not have the same pace of leaning, teachers who make a distinction in instruction in mixed-ability classrooms try to find appropriately challenging learning experiences for all their students.
- **Differentiated instruction is Proactive:** The teacher keeps in mind that different learners have differing needs therefore the teachers proactively proceeds with a variety of ways to 'get at' and express learning.
- **Differentiated instruction is more qualitative than quantitative:** Adjusting the quantity of an assignment will generally be less effective than adjusting the nature of the assignment to match the needs of the students.
- **Differentiated instruction provides multiple approaches to content, process, and product:** Teachers keeping in mind the nature of difference among the three, offers different approaches to what students learn, how they learn it, and how they demonstrate what they've learned
- **Differentiated instruction is a blend of whole:** Class, group, and individual instruction
- **Differentiated instruction is organic:** In a differentiated classroom, students and teachers learn together. Though teachers may know a little more about the subject matter at hand, they are constantly learning about how their students learn. Teachers assess students' readiness in a variety of ways, continuous association with students is compulsory to refine the learning opportunities so that they prove to be effective for each student. The nature of differentiated instruction is dynamic.

4.3.4 Problem-centered Design

Problem- centered design can be classified into

- Life Situation Design
- Core Design
- Social problems and Reconstructionist Design

1. Life Situation Design

Persistent life situations are vital to a society's functioning and therefore it makes sense to systematize and organize a curriculum around them. Students will see direct significance to what they are studying if the content is organized around the various aspects of community existence. By making the students study these social or life situations, they not only come to know the ways to improve society but also become directly involved in that development.

Strengths

- Presents subject matter in an incorporated manner
- Motivates students to learn and apply problem solving procedure
- Helps students to determine scope and sequence of essential areas of learning

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Weaknesses

- It does not expose student effectively to their culture

2. Core Design

Centers on all-purpose education and is based on problems arising out of common human activities

Strengths

- Unified content
- Provides relevant subject matter
- Encourages active processing of information
- Develops democratic environment in the classroom

Weaknesses

- It is non-traditional thus difficult in accepting
- Ignores the fundamentals
- Materials are hard to find
- Requires an exceptional teacher

3. Social problems and Reconstructionist Design

- Curriculum should concentrate on current social problems and social action projects that are aimed at reconstructing society and educators will effect social change and create a more just society.

4.3.5 Experience-cum-Activity-centred Curriculum

The opinion behind the activity based approach is that children are 'doers' and learn language basically because they need it and remember new language better when they encounter and use it in a realistic situation. Activity-based learning identifies that young children are physical, tactile and use all their senses. Its major aim is to teach language and address a child's linguistic intelligence while developing the child's other intelligences as well.

Advantages and disadvantages of an activity-based curriculum

Activity-based learning refers to learning by doing. In it, instead of sitting through a lecture, students go out and follow an activity-based curriculum and complete tasks and use their artistic energy to guide them through the material while the teacher plays the role of a facilitator. This learning style consists of both the advantages as well as disadvantages when compared to the other instructional methods.

- **Student led:** It is led by students and it creates a feeling of responsibility among the students by holding them accountable for seeing the lesson through in a meaningful way. Students help in planning, organizing and executing a lesson plan from the beginning to the end. Executing the material rather than just listening to it assists a number of students in retaining the information in a meaningful maner.

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- **Student creativity:** The freedom of an activity-based curriculum produces an openness and spirit for experimentation in the classroom. Students tap into various sources of knowledge while they explore the material by physical tasks. Students have to look at basic mathematics, language arts, social studies and science lessons from several perspectives, both creative and practical. A student who has hard time learning in a traditional fashion might see an improvement through active learning.
- **Planning time:** An activity-based curriculum requires more time to plan and organize than a lecture. For planning an active lesson, teachers have to master the art of making a basic structure for the lesson while simultaneously permitting room for student ideas and other deviations from the original plan. This needs thinking via possible setbacks that proves difficult prior to having experience making and performing active lessons. As a teacher tests out her procedures for making active lesson plans, they will carry on improving and becoming more effective.

4.3.6 Balanced/Coherent Curriculum

There has always been a lot of confusion regarding the curriculum. This confusion is at times equated to a jigsaw puzzle. When you work on a jigsaw puzzle it is necessary for you to actually see the picture that you are about to finish. If you do not see it, all the pieces of the puzzle appear to be incoherent. The child confronted with the curriculum is very often unable to see the whole picture and tends to ask 'why do we have to do this'. The answer given often is'You will find out later'.

This is perhaps the origin of the 'coherent' curriculum. 'The idea of coherence begins with a view of the curriculum as a broadly conceived concept-as the curriculum-that is about something. It is not simply a collection of disparate parts or pieces that accumulate in student experiences and on transcripts. A coherent curriculum has a sense of the forest as well as the trees, a sense of unity and connectedness, of relevance and pertinence. Parts or pieces are con-nected or integrated in ways that are visible and explicit. There is a sense of a larger, compelling purpose, and actions are tied to that purpose.' James A. Beane towards a Coherent Curriculum 1995.

'When a curriculum is coherent it is more relevant and pertinent. The educational experiences are better integrated and this in turn broadens their understanding of the world. The coherent curriculum offers unforgettable experiences to young people.

Creating coherence includes connecting parts or pieces of the curriculum. It also means classifying information and skills and making the best use of learning experiences. Coherence also implies identifying themes and purposes.

Coherence in curriculum involves creating and maintaining vis-ible connections between purposes and everyday learning experiences.

Adults must decide on learning objectives and learning experiences .There must be a continuous connection between the larger purpose and the specific activity. Students must always get a sense of the curriculum as a whole. Moving towards a coherent curriculum includes creating contexts that organize and connect learning experiences.

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In real life when you face a problem you do not sit to analyse it as if it is a math problem or a science problem. You resort to your educational experiences to sort it. Knowledge is integrated in real life but tends to be separated at school. So you come to the concept of organizing the curriculum around themes. This serves the purpose of seeing some use of the learning experiences....' Intra-disciplinary efforts bring together smaller pieces of content or skill that are actually parts of a larger discipline of knowledge but that have been disconnected by overspecialization in the curriculum. Here you might place the struggle to create 'social studies' out of history, geography, civics and other aspects of social living (Saxe 1992). Other intra-disciplinary examples are the more recent whole language movement and projects in science and mathematics aimed at reconstituting the larger disciplines. A second exam-ple is multidisciplinary or multi-subject arrangements that involve correla-tions among two or more areas' (Jacobs 1989). This leads on to the concept of curriculum integration and it implies non-separate subject arrangements. Advocates of this type of curriculum reassure that content will not be abandoned, but there is a risk that content covered through the subject curriculum is at risk.

Moving towards a coherent curriculum must involve more fully exploring how people make sense out of experiences. Students of all ages construct schemes of meaning about themselves and their world (Caine and Caine 1991). Such schemes are constructed out of experiences and are shaded by the influences of culture. So it is that any particular experience might have a variety of meanings among young people, depending on race, ethnicity, class, gender, geography, age, family patterns and many other cultural aspects. Such aspects of cultural diversity may also serve as a kind of 'glue' for piecing together experiences to create the 'pictures' that are schemes of meaning. In short, the continuous interplay between experience and meaning is a crucial dimension of a sense of coherence. Iran-Nejad, McKeachie and Berliner put it this way: 'The more meaningful, the more deeply or elaborative processed, the more situated in context and the more rooted in cultural, background, meta-cognitive and personal knowl-edge an event is, the more readily it is understood, learned and remem-bered' (1990, p. 511).

Advantages of balanced curriculum

The advantages of balanced curriculum are as follows:

- It puts a stop to boredom and poor behaviour in classroom.
- It can meet the need of every child in classroom without having to order costly materials.
- It is cost-effective and gives access to an online curriculum that includes the following:
  - o Limitless mix and match digital lessons
  - o Instant downloads
  - o Personalized teacher and student Internet links
  - o Individual e-mail accounts for each child in the classroom
  - o Customized digital textbooks
  - o Personalized video and audio instruction
- Parents, teachers and students practice the satisfaction of learning within a affordable and convenient balanced curriculum.

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- It captures the attention of the students in classroom and gains the respect of the parents and child.

4.3.7 Fused Curriculum

This curriculum is designed specially for gifted learners. It has been created to respond to gifted learners' characteristics of precocity, intensity and complexity through its three dimensions of advanced content, higher level processes and product development and inter-disciplinary concepts, issues and themes.

As this curriculum is so learner specific it cannot have far reaching implications for the learner population. However it is necessary for us to know about it.

The notion of a fused curriculum is not new and has been in existence from quite some time.

The very notion of 'integration' incorporates the idea of unity amongst different forms of knowledge and the respective disciplines. It is closely related with the constructivist theory and is dependent on the fact that brain finds connections all the time while creating new knowledge.

Educational researchers have discovered that a fused curriculum can lead to the following:

- Greater intellectual curiosity
- Improved attitude towards schooling
- Enhanced problem-solving skills
- Higher achievements in college

Barab and Landa (1997) pointed out that when students concentrate on problems worth solving, motivation and learning increase.

Another premise supporting the move towards integrated curricula is that the current system of discipline-based education is not as effective as it must be. The assumption is that most real world problems are multidisciplinary in nature and that the current curriculum is unable to engage students in real world situations. Thus, a discipline-based curriculum should be replaced with an integrated curriculum (Kain, 1993).

In this approach teachers teaching a number of different subjects are grouped together to work with students. The most typical daily schedule includes groups of approximately 30 students rotating through the four disciplines. Some times, the teachers might decide to initiate a new theme to the entire group at the same time. Or, they may take all of their students on a field trip. In practice, this model is being used with greater frequency at the middle school level.

Advantages of fused curriculum

Fused curriculum offers several advantages:

- Teachers are given time to work together.
- They have a limited number of students.
- It supports traditional curriculum.
- It offers scheduling flexibility to the team.

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Disadvantages of fused curriculum

Fused curriculum offers several disadvantages. Some of them are as follows:

- Teachers have to just continue doing what they have always done without paying any attention to the inter-disciplinary or integrated curriculum.
- The teachers have to develop their own curriculum.
- As the process of curriculum development is quite time consuming, they are able to execute an integrated curriculum for only a small part of the school year.

4.3.8 Co-related Curriculum

Correlated curriculum refers to the other topics or subjects that are akin the subjects chosen by you. It helps you understand the chosen subject in a better manner.

Advantages of co-related curriculum

The advantages of co-related curriculum are as follows:

- **Teamwork:** Those students who take part in co-related activities achieve teamwork skills. They have a sense of belonging and unity. Their communication skills are quite enhanced, and they learn how to work well with others, how to take turns and be patient. These skills are usually helpful to students in their future careers and in relationships with family, friends and co-workers. Teamwork guides towards the increased self-confidence when students feel support from their peers.
- **Exercise:** A lot of co-related activities encourage a healthy and active lifestyle. Athletic extra-curricular activities like soccer, football, track, dance, cheer leading and choir group all include body movement. The cardiovascular workout that takes place during these programs brings energy to participants and keeps students attentive in class. When a student keeps healthy lifestyle, he is less liable to be sick and, therefore, is less likely to miss school. The healthy lifestyle that a student inculcates at a young age by co-related activities usually follows him all through his life and makes him a healthy and dependable employee.
- **Direction:** The students who are involved in activities outside school are more likely to gain an idea of direction. A student might choose a particular career path due to his accomplishments in a lot of co-related activities like a student who likes to participate in debates or speech teams might realize that he wishes to become a politician or lawyer. Co-related activities might even lead students to attend college or university. Students at times even receive scholarships based on their performance in a co-related manner.
- **Positive experience:** Contribution in co-related activities encourages positive experiences like teamwork, motivation and reaching goals. Whenever a student is involved in any extra-curricular activity, he is less probable to get involved in negative and harmful schemes like drug or alcohol use, vandalism or gang involvement. Furthermore, most of the schools have policies, according to which any student who makes poor choices like drug or alcohol use or fails in any class is prohibited from participating in such events. This can encourage those students who enjoy playing sports and other activities to lead a drug-free lifestyle and sustain good grades.

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Disadvantages of co-related curriculum

In the correlated curriculum, it is assumed that two or more subjects often exist in a school side by side with no apparent connection. However, there are some possible points at which relationship may be established. There are many points at which any two subjects do not correlate and efforts to correlate them are made. Correlation necessitates cooperative planning and mutual help and understanding among the various teachers before any cooperative project can be undertaken.

4.3.9 Horizontal and Vertical Design

Horizontal and vertical organizations form the essential dimensions of a curriculum design. While vertical designs (sequence, continuity) are related to the longitudinal arrangement of a design component, horizontal designs (scope, integration) on the other hand deals with the side-by-side arrangement of the components in the curriculum design. For example, a spiral format of the curriculum provides for both horizontal (widening of knowledge) and vertical (deepening of knowledge) aspects of a curriculum design at the same time. Figure 4.1 represents the concept of horizontal and vertical articulation from preschool to adult.

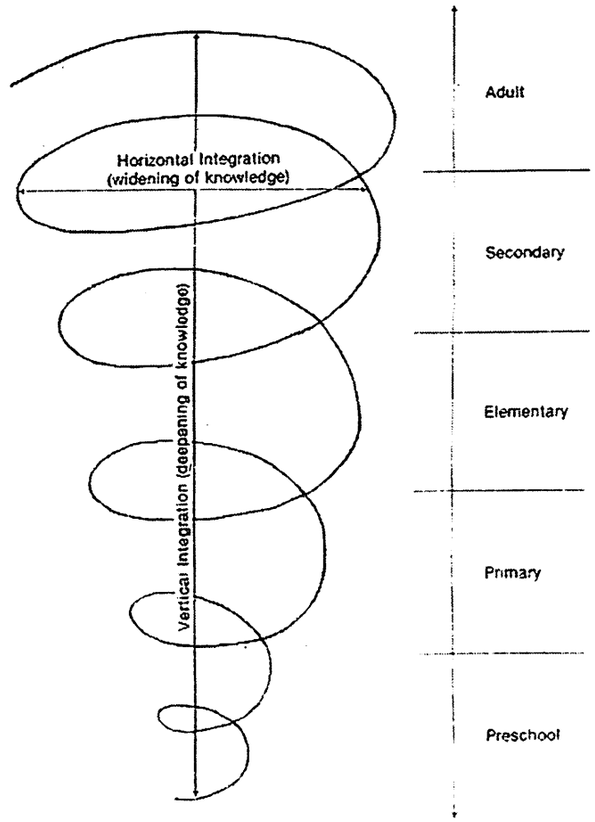


Fig. 4.1 Horizontal and Vertical Articulation

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Check Your Progress

3. List the advantages of subject-centered curriculum.
4. Define core curriculum.
5. State any three advantages of learner-centered curriculum.
6. What is the difference between differentiated and undifferentiated curriculum design?

4.4 NATIONAL CURRICULUM FRAMEWORK FOR SECONDARY EDUCATION-2005

The National Curriculum Framework (NCF 2005) is one of four National Curriculum Frameworks published in 1975, 1988, 2000 and 2005 by the National Council of Educational Research and Training (NCERT) in India. NCF 2005 has been translated into 22 languages and has influenced the syllabi of 17 States.

The document frequently revolves around the question of curriculum load on children. National Curriculum Framework (NCF) 2005 owes its present shape and form to the outbreak of ideas generated through a succession of rigorous deliberations by distinguished scholars from different disciplines, principals, teachers and parents, representatives of NGOs, NCERT faculty, and several other stakeholders at various levels. It received noteworthy contributions from state Secretaries of Education and Directors of SCERTs, and participants of the regional seminars organized at the RIEs. Experiences shared by principals of private schools and Kendriya Vidyalayas (KVs) and by teachers of rural schools across the country helped in sharpening the ideas. Voices of thousands of people, students, parents, and public at large have through regular mail and electronic media helped in mapping multiple viewpoints.

Since the time around year 1986 when the National Policy on education was approved by the Parliament, efforts to redesign the curriculum have been focused on the construction of a national system of education. The basic concerns of education are to help the children to make sense of life and develop their potential, to define and follow a purpose and be acquainted with the right of others. What we require to replicate is the shared interdependence of humans, as Tagore has said, 'we achieve our greatest happiness when we realise ourselves through others.' Likewise, we need to summarize our commitment to the concept of equality, within the background of cultural and socio-economic diversity from which children enter into the gateway of the school. Individual aspirations in current competitive economy have forced to reduce education to just being an instrument of material success. The insight, which places the individual in exclusively competitive relationships, puts irrational strain on children, and thus distorts values. It also makes learning from each other a matter of little consequence. Education must be able to support values that foster peace, humaneness and tolerance in a multicultural society .This document seeks to provide a framework within which teachers and schools can choose and plan experiences that they think children should have. In order to realise educational objectives, the curriculum should be conceptualised as a

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structure that clearly expresses the feeling of the required experiences. For this, it should deal with some basic questions such as:

(a) What educational purposes should the schools pursue to achieve through the students?

(b) What educational experiences can be provided that is likely to achieve these purposes?

(c) How can these educational experiences be meaningfully planned?

(d) How do we ensure that these educational purposes are indeed being accomplished?

The review of the National Curriculum Framework, 2000 was initiated specifically to address the problem of curriculum load on children. A committee appointed by the Ministry of Human Resource Development in the early 1990s had analysed this problem thoroughly, tracing its roots to the system's tendency to treat information as knowledge. In its report, *Learning Without Burden,* the committee pointed out that learning at school cannot become a thrilled experience unless we change our outlook that perceives the child as a mere receiver of knowledge and should move further than the convention of using textbooks as the basis for examination. The desire to teach everything is based on the thinking that children lack their own creative instinct and their capacity to construct knowledge out of their experience.

Guiding Principles of NCF 2005

It proposes four guiding principles for curriculum development, namely:

- Linking knowledge to the life even outside the school
- Ensuring that learning is shifted away from rote methods to live experiences
- Enriching the curriculum to provide for overall development of children rather than textbook centric,
- Making examinations system more flexible and integrated into classroom life

The document is divided into 5 areas:

- Perspective
- Learning and Knowledge
- Curriculum Areas, School Stages and Assessment
- School and Classroom Environment
- Systemic Reforms
- Systemic Reforms

(a) Areas of Curricular Concern

1. Teaching of Sciences
2. Teaching Mathematics
3. Teaching of Indian Languages
4. Teaching of English
5. Teaching of Social Sciences

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6. Learning and Habitat
7. Art, Dance, Theatre and Music

(b) Areas for systemic reform

1. Aims of Education
2. Systemic Reform for Curricular Change
3. Curriculum, syllabus and Textbooks
4. Teacher education for Curriculum Renewal
5. Examination reforms
6. Early childhood education
7. Work and education
8. Educational technology
9. Heritage crafts
10. Health and physical education

NCF 2005 recommends significant changes in Language, Maths, Natural Science and Social Sciences with an outlook to reduce stress and making education more pertinent to the present day and future needs of children. In Language, it makes a renewed attempt to put into practice the three-language formula giving importance to mother tongue as the medium of instruction. India is a multilingual country and curriculum should encourage multilingual proficiency in every child, including proficiency in English, which will become achievable only if learning builds on sound language pedagogy of the mother tongue. The NCF document draws attention to four other areas, specifically Art, Education, Health and Physical Education, Work and Education and Education for Peace.

Examination Reforms

The report 'Learning without Burden' notes that public examination at the end of Class X and XII should be reviewed with a view to replace prevailing text based and quiz type questioning which induced an inordinate level of anxiety and stress. While urban middle class children are stressed from the need to perform extremely well, rural children are not sure about whether their preparation is adequate even to succeed. The high failure rates, especially among the rural, economically weaker and socially deprived children, forces one to critically review the whole system of evaluation and examination.

Paper Setting, Examining and Reporting

In order to improve the validity of current examinations, paper setting needs to be revalued. The focus could shift to question setting rather than paper setting. Such questions need not be generated by experts only. Through wide canvassing, good questions can be pooled all year round, from teachers, college professors in that discipline, educators from other states, and even students. These questions, after careful vetting by experts states, and even students could be categorize, according to level of difficulty, topic area, concept/competency being evaluated, time estimated to solve. These could be maintained along with a record of usage and testing record, to be drawn on at the time of generating question papers.

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Secondary and Higher Secondary Stage (Class IX to XII): Assessment may be based more on tests, examinations and project reports, for the knowledge-based areas of the curriculum, along with self-assessment. Other areas would be accessed via observation and also through self-evaluation.

Reports could be presented along with much more analysis provided to the student regarding various skill/knowledge areas, and percentile, etc. This would assist them in understanding areas of study that they need to focus on and also help them by providing a basis for further choices they make regarding what to study further.

Innovation in Ideas and Practices

Plurality of Textbooks

Given the perspective that curricular content must meaningfully incorporate experiences of children and their diverse cultural contexts, including languages, it is important that textbook writing is decentralized keeping in view the capacities that are required as well the systems that will make this possible. The writing of textbooks requires a range of capacities that include academic and research inputs, understanding of children's developmental levels, effective skills of communication and children's developmental levels, effective skills of communication and design, etc. While the SCERT which presently has been given the task of textbook writing can continue to be the nodal organization for this purpose, the actual envisioning of the process, selection and writing of content must be done in a collaborative manner by teams rather than by individual subject experts.

Encouraging Innovations

Individual teachers often explore new ways of transacting the curriculum to address the needs of students within their specific classroom context (including constraints that they may be facing of space, large numbers, absence of teaching aids, diversity in students, the compulsions of examinations and so on). These efforts, often pragmatic but also creative and ingenious, by and large remain invisible to the school and larger teaching community and are usually not valued by teachers themselves. The sharing of teaching experiences and diverse classroom practices can provide opportunities for an academic discourse to develop within schools as teachers interact with and learn from each other. It will also encourage new ideas and facilitate innovation and experimentation.

For a start there is a need to create structured spaces within schools, at the level of the cluster and block where teachers are encouraged to share and discuss classroom practices and experiences.

The use of Technology

The judicious use of technology can increase the reach of educational programmes, facilitate management of the system as well as help address specific learning needs and requirements. For instance, the mass media can be used to support teacher training, facilitate classroom learning and be used for advocacy. Possibilities of teaching and learning at varied paces, self-learning, enabling dual modes of study etc. could all benefit from the use of technology, particularly ICT to enable these processes.

The NCF covers an immense range of crucial parameters of the curriculum. It makes a concise survey of the educational scenario and the efforts made in the past in the restructuring of the curriculum. It contains quite a lot of excellent recommendations of the various dimensions of the curriculum and related issues.

The CBSE curriculum presently in use covers almost all the features of the proposed NCF. The CBSE takes due care of updating it, revising it, and incorporating changes in the evaluation practices. Of course there is always scope for improvement.

CHECK YOUR PROGRESS

7. Mention the examination reforms as suggested by NCFSE-2005.
8. How can technology be used in schools according to NCFSE-2005?

4.5 NATIONAL CURRICULUM FRAMEWORK FOR SECONDARY EDUCATION- 2009

Overview

The Teacher Education Policy in India has evolved over time and is based on recommendations contained in various Reports of Committees/Commissions on Education, the important ones being the Kothari Commission (1966), the Chattopadhyay Committee (1985), the National Policy on Education (NPE 1986/92), Acharya Ramamurthi Committee (1990), Yashpal Committee (1993), and the National Curriculum Framework (NCF, 2005). The Right of Children to Free and Compulsory Education (RTE) Act, 2009, which became operational from 1st April, 2010, has important implications for teacher education in the country.

Legal and Institutional Framework

Within the federal structure of the country, while broad policy and legal framework on teacher education is provided by the Central Government, implementation of various programmes and schemes are undertaken largely by state governments. Within the broad objective of improving the learning achievements of school children, the twin strategy is to (a) prepare teachers for the school system (pre-service training); and (b) improve capacity of existing school teachers (in-service training).

For pre-service training, the National Council of Teacher Education (NCTE), a statutory body of the Central Government, is responsible for planned and coordinated development of teacher education in the country. The NCTE lays down norms and standards for various teacher education courses, minimum qualifications for teacher educators, course and content and duration and minimum qualification for entry of student-teachers for the various courses. It also grants recognition to institutions (government, government-aided and self-financing) interested in undertaking such courses and has in-built mechanism to regulate and monitor their standards and quality.

For in-service training, the country has a large network of government-owned teacher training institutions (TTIs), which provide in-service training to the school teachers.

The spread of these TTIs is both vertical and horizontal. At the National Level, the National Council of Educational Research and Training (NCERT), along with its six Regional Institutes of Education (REIs) prepares a host of modules for various teacher training courses and also undertakes specific programmes for training of teachers and teacher educators. Institutional support is also provided by the National University on Education al Planning and Administration (NUEPA). Both NCERT and NUEPA are national level autonomous bodies. At the state level, the State Councils of Educational Research and Training (SCERTs), prepares modules for teacher training and conducts specialized courses for teacher educators and school teachers. The Colleges of Teacher Education (CTEs) and Institutes for Advanced Learning in Education (IASEs) provide in-service training to secondary and senior secondary school teachers and teacher educators. At the district level, in-service training is provided by the District Institutes of Education and Training (DIETs). The Block Resource Centres (BRCs) and Cluster Resource Centres (CRCs) form the lowest rung of institutions in the vertical hierarchy for providing in-service training to school teachers. Apart from these, in-service training is also imparted with active role of the civil society, unaided schools and other establishments.

Financing of Programmes and Activities

For pre-service training, the government and government-aided teacher education institutions are financially supported by the respective State Governments. Further, under the Centrally Sponsored Scheme on Teacher Education, the Central Government also supports over 650 institutions, including the DIETs, CTEs and the IASEs.

For in-service training, financial support is largely provided by the Central Government under the Sarva Shiksha Abhiyan (SSA), which is the main vehicle for implementation of the RTE Act. Under the SSA, 20 days in-service training is provided to school teachers, 60 days refresher course for untrained teachers and 30 days orientation for freshly trained recruits. Central assistance for in-service training is also provided to District Institutes of Education and Training (DIETs), Colleges of Teacher Education (CTEs) and Institutes of Advanced Studies In Education (IASEs) under the Centrally Sponsored Scheme on Teacher Education. State Governments also financially support in-service programmes. Several NGOs, including multi-lateral organizations, support various interventions, including in-service training activities.

Implications on Teacher Education of the Right of Children to Free and Compulsory Education Act, 2009

The Right of Children to Free and Compulsory Education Act, 2009 has implications on the present teacher education system and the Centrally Sponsored Scheme on Teacher Education. The Act inter alia provides that:

- The Central Government shall develop and enforce standards for training of teachers;
- Persons possessing minimum qualifications, as prescribed by an academic authority authorize by the Central Government shall be eligible to be employed as teachers;
- Existing teachers not possessing such prescribed qualifications would be required to acquire that qualification within a period of 5 years.
- The Government must ensure that the Pupil-Teacher Ratio specified in the Schedule is maintained in each school

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- Vacancy of a teacher in a school, established, owned, controlled or substantially financed by the Government, shall not exceed 10 per cent of the sanctioned strength.

National Curriculum Framework on Teacher Education

The National Council of Teacher Education (NCTE) has prepared the National Curriculum Framework of Teacher Education, which was circulated in March 2009. This Framework has been prepared in the background of the NCF, 2005 and the principles laid down in the Right of Children to Free and Compulsory Education Act, 2009 which necessitated an altered framework on Teacher Education which would be consistent with the changed philosophy of school curriculum recommended in the NCF, 2005. While articulating the vision of teacher education, the Framework has some important dimensions of the new approach to teacher education, as under:

- Reflective practice to be the central aim of teacher education;
- Student-teachers should be provided opportunities for self-learning, reflection, assimilation and articulation of new ideas;
- Developing capacities for self-directed learning and ability to think, be critical and to work in groups.
- Providing opportunities to student-teachers to observe and engage with children, communicate with and relate to children. The Framework has highlighted the focus, specific objectives, broad areas of study in terms of theoretical and practical learnings, and curricular transaction and assessment strategies for the various initial teacher education programmes. The draft also outlines the basic issues that should guide formulation of all programmes of these courses. The Framework has made several recommendations on the approach and methodology of in-service teacher training programmes and has also outlined a strategy for implementation of the Framework. As a natural corollary to the NCFTE, the NCTE has also developed 'model' syllabi for various teacher education courses.

Reforms in Regulatory Framework

The National Council for Teacher Education (NCTE) was constituted under the National Council for Teacher Education Act, 1993 for achieving planning and coordinated development of teacher education in the country, for regulation and proper maintenance of norms and standards in the teacher education system. In the recent past the NCTE has undertaken various steps for systemic improvements in its functioning and in improving the teacher education system, as under:

- Based on the study of demand and supply of teachers and teacher educators of the various states, the NCTE has decided not to receive further applications for several teacher education courses in respect of 13 States. This has led to substantial rationalization in the demand-supply situation across States;
- The Regulations for grant of recognition and norms and standards for various teacher education courses were revised and notified on 31st August, 2009. The applications for grant of recognition are now processed strictly in chronological order. The new Regulations make the system more transparent, expedient and time bound, with reduction in discretionary powers of the Regional Committees;

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- E-Governance system has been introduced by way of providing online facility for furnishing of applications and online payment of fees. MIS has been developed to streamline the process of recognition;
- The National Curriculum Framework for Teacher Education has been developed keeping in view NCF, 2005;
- Academic support is being provided through preparation of Manual for the teacher education institutions and publication and dissemination of Thematic Papers on Teacher Education.
- Various quality control mechanisms have been developed, including re-composition of the Visiting Teams, periodical monitoring of the teacher education institutions and de-recognition of institutions not conforming to the Norms and Standards prescribed by the NCTE.

CHECK YOUR PROGRESS

9. What is the twin strategy of teacher education?
10. For what purpose was the NCTE established?

4.6 SUMMARY

- The curriculum has different approaches and types.
- In subject-centered curriculum, subject matter taught should echo basic essential learning for all pupils.
- Curriculum is a cumulative process and the experiences in the school exert its influences on the learner like the ways water dripping on a stone wears it away.
- Student-centered learning also known as child-centered learning is an approach of education. It focusses on the requirement of students.
- Instruction is usually planned to access a developmental level that is measurable to the student's current stage in development.
- Creating coherence includes connecting parts or pieces of the curriculum. It also means classifying information and skills and making the best use of learning experiences.
- Coherence in curriculum involves creating and maintaining vis-ible connections between purposes and everyday learning experiences.
- Activity-based learning identifies that young children are physical, tactile and use all their senses. Its major aim is to teach language and address a child's linguistic intelligence while developing the child's other intelligences as well.
- A core curriculum is a curriculum, or course of study that is deemed central and usually made mandatory for all students of a school or school system.
- Critical thinking curriculum model views curriculum as an integration of technology with the curriculum.

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- A good curriculum needs to have experiential-oriented instruction.
- Curriculum design is focused and purposeful
- Curriculum design is creative phenomena
- Curriculum design is a methodical way of going about planning instruction, even though there is no hard and fast rule to follow some inflexible set of steps. Curriculum decisions that are made at one stage necessarily do not depend on decisions made at other stages, and that the curriculum-design process tends to be iterative, so it is always likely that different stages being crossed can return for reassessment and possible amendment.
- Different Sources of Curriculum Design are Knowledge Learner Science Society and External and divine sources
- In an undifferentiated classroom instruction only student similarities takes the core stage. In a differentiated classroom, commonalities are acknowledged and teaching and learning is built upon student differences.
- In a differentiated curriculum teachers offer diverse approaches to *what students learn* (content), *how students learn* (process) and *how students demonstrate what they have learnt* (product).
- The National Curriculum Framework (NCF 2005) is one of four National Curriculum Frameworks published in 1975, 1988, 2000 and 2005 by the National Council of Educational Research and Training (NCERT) in India. NCF 2005 has been translated into 22 languages and has influenced the syllabi of 17 States.
- **Guiding Principles of NCF 2005** proposes four guiding principles for curriculum development, namely:
  - Linking knowledge to the life even outside the school
  - Ensuring that learning is shifted away from rote methods to live experiences rather than textbook centric,
  - Enriching the curriculum to provide for overall development of children
  - Making examinations system more flexible and integrated into classroom life
- The judicious use of technology can increase the reach of educational programmes, facilitate management of the system as well as help address specific learning needs and requirements.

4.7 KEY TERMS

- **Curriculum:** It refers to the regular or a particular course of study in a school.
- **Pupil:** It refers to a **student** who is under the direct supervision of a teacher or professor.
- **Coherence:** It is the quality or state of cohering, especially a logical, orderly and aesthetically consistent relationship of parts.

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4.8 ANSWERS TO 'CHECK YOUR PROGRESS'

1. The different sources of curriculum designs are:
   - Knowledge
   - Learner
   - Science
   - Society
   - External and divine sources
2. Curriculum design operates on many levels. Design decisions that are taken at one level must be well-suited with those at the other levels. For example, a middle-school curriculum design that is mismatched with the elementary and high school designs will almost certainly result in a defective K-12 curriculum, no matter how good each part is on its own. In the same manner, the middle-school curriculum itself alone cannot be effective as a whole unless the designs of its grades are in accordance to it.
3. The advantages of subject-centered curriculum are as follows:
   - It has traditional approach, which is liked by students as they are used to it and it fits in their idea of what a school should be.
   - Learning distinct skills in a step-by-step process leads to traditional testing.
   - Test scores can be effortlessly quantified and explained to funders as program outputs.
4. A core curriculum is a curriculum, or course of study that is deemed central and usually made mandatory for all students of a school or school system.
5. The advantages of learner-centred curriculum are as follows:
   - Strengthens student motivation
   - Promotes peer communication
   - Reduces disruptive behaviour
   - Builds student-teacher relationships
   - Promotes discovery/active learning
6. In an undifferentiated classroom instruction only student similarities takes the core stage. In a differentiated classroom, commonalities are acknowledged and teaching and learning is built upon student differences.
7. The report 'Learning without Burden' notes that public examination at the end of Class X and XII should be reviewed with a view to replace prevailing text based and quiz type questioning which induce an inordinate level of anxiety and stress. While urban middle class children are stressed from the need to perform extremely well, rural children are not sure about whether their preparation is adequate even to succeed. The high failure rates, especially among the rural, economically weaker and socially deprived children, forces one to critically review the whole system of evaluation and examination.
8. According to NCRSE 2005 the judicious use of technology can increase the reach of educational programmes, facilitate management of the system as well as help address specific learning needs and requirements. For instance, the mass media can be used to support teacher training, facilitate classroom learning and be used for advocacy. Possibilities of teaching and learning at varied paces, self-

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learning, enabling dual modes of study etc. could all benefit from the use of technology, particularly ICT to enable these processes.

9. Within the federal structure of the country, while broad policy and legal framework on teacher education is provided by the Central Government, implementation of various programmes and schemes are undertaken largely by state governments. Within the broad objective of improving the learning achievements of school children, the twin strategy is to (a) prepare teachers for the school system (pre-service training); and (b) improve capacity of existing school teachers (in-service training).
10. The National Council for Teacher Education (NCTE) was constituted under the National Council for Teacher Education Act, 1993 for achieving planning and coordinated development of teacher education in the country, for regulation and proper maintenance of norms and standards in the teacher education system.

4.9 QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write a detailed account on 'Attributes of Curriculum Design'.
2. Differentiate between subject-centered and learner-centered curriculum.
3. What are the advantages of a balanced curriculum and how can it be achieved?
4. What is a fused curriculum?
5. Write a short note on problem-centered curriculum.

Long-Answer Questions

1. Describe the implications of student-centered curriculum.
2. Discuss the concept of fused curriculum.
3. Explain the advantages and disadvantages of an activity-based curriculum.
4. What are the main sources of curriculum design? Explain any three.
5. Write a short note on National Curriculum Framework for Secondary Education-2009.

4.10 FURTHER READING

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UNIT 5 CURRICULUM EVALUATION

NOTES

Structure

5.0 Introduction
5.1 Unit Objectives
5.2 Meaning, Nature and Need of Curriculum Evaluation
  5.2.1 Meaning and Nature of Curriculum Evaluation
  5.2.2 Evaluation as Comparing Objectives and Outcomes
  5.2.3 Need for Evaluating Curriculum
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  5.4.1 Outcome of Curriculum Evaluation
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  5.4.3 Curriculum Revision
5.5 Summary
5.6 Key Terms
5.7 Answers to 'Check Your Progress'
5.8 Questions and Exercises
5.9 Further Reading

5.0 INTRODUCTION

Many improvements have taken place in the educational system of the country over the last two decades. Many scientific discoveries are now available as tools to hasten acquisition of productive education that would be useful in contributing effectively to the development of the nation. Arts and science have evolved newer and bigger methods of communication, which are vital components for excellent teacher-student relations. It is therefore important that as the world progresses, the curriculum must be revised and improved. This need for revision cannot be overemphasized as it can be seen in the speed of revisions of many books. Technology has almost made it mandatory that the curriculum must be revised from time to time.

This unit primarily deals with curriculum evaluation and revision principles and how these are to be achieved.

5.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Discuss the meaning, nature and the need for curriculum evaluation
- Identify the focus of curriculum evaluation
- Explain the outcomes of curriculum evaluation

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5.2 MEANING, NATURE AND NEED OF CURRICULUM EVALUATION

The term curriculum evaluation has been used in various terms of reference. Some writers have used curriculum evaluation to refer to curriculum product evaluation; others use the term in reference to curriculum programme evaluation. Curriculum products such as textbooks or natural curricula are evaluated prior to large-scale implementation. These evaluations are conducted using pre-specified external criteria, outcome data from field trials, or both. Curriculum programmes refer to the instruction that takes place within specific field contexts.

5.2.1 Meaning and Nature of Curriculum Evaluation

Evaluation is defined as the process of accumulating data on a particular programme in order to assess its value or worth. Evaluation is performed with the aim of determining whether a programme should be adopted, rejected or revised. Evaluation is performed for various purposes. For instance, programmes are evaluated to answer its questions and concerns. The public want to know whether the curriculum implemented has achieved its aims and objectives. In a similar manner, teachers want to know whether what they are doing in the classroom is effective and the developer or planner wants to know how to improve the curriculum product.

- **McNeil** (1977) states that "curriculum evaluation is an attempt to throw light on two questions: Do planned learning opportunities, programmes, courses and activities as developed and organised actually produce desired results? How can the curriculum offerings best be improved?" (p.134).
- **Ornstein and Hunkins** (1998) define curriculum evaluation as "a process or cluster of processes that people perform in order to gather data that will enable them to decide whether to accept, change, or eliminate something- the curriculum in general or an educational textbook in particular" (p.320).
- **Worthen and Sanders** (1987) define curriculum evaluation as "the formal determination of the quality, effectiveness, or value of a programme, product, project, process, objective, or curriculum" (p.22-23).
- **Gay** (1985) argues that the aim of curriculum evaluation is to identify its weaknesses and strengths as well as problems encountered in implementation; to improve the curriculum development process; to determine the effectiveness of the curriculum and the returns on finance allocated.
- **Oliva** (1988) defined curriculum evaluation as the process of delineating, obtaining, and providing useful information for judging decision alternatives. The primary decision alternatives to consider based upon the evaluation results are: to maintain the curriculum as is; to modify the curriculum; or to eliminate the curriculum.

In simple terms, evaluation can be understood to be a disciplined inquiry to assess the worth of things, and 'things' include programmes, procedures or objects. Although similar data collection tools may be used, research and evaluation are two different processes. Research and evaluation can be differentiated on the basis of the following three dimensions:

- Evaluation does not usually have generation of knowledge as its objective. Evaluation is applied and research is basic.
- The process of evaluation results in information that may be used in decision-making or in the formulation of policies. Evaluation provides information that can be immediately used while research may not have the same benefits as evaluation.
- Evaluation is a judgement of worth. Evaluation result in value judgements while research need not and some would say should not.

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With respect to curriculum, the process of evaluation involves making value judgments regarding the quality and benefits of the curriculum. Curriculum evaluation is influenced by its audience and requirements. Potential audience may include the following:

- **Policy makers** and other **stakeholders** (administrators, teachers, students, parents, communities) – to inform future action.
- **Donors** – to attract funding or to report on the utilization of funds.
- **Researchers** – for international comparison and identification of effective practices.

Evaluation of curricula is basically concerned with the following:

(i) Impact of the curriculum
- on individual students, their needs, their level of engagement and their performance;
- on society, including the appropriateness of values communicated and attitudes fostered, and the level of public satisfaction;
- on the economy including labour markets as an indicator of economic development;

(ii) Process through which the curriculum was developed

(iii) Content and design of the curriculum compared with:
- recent social, technological, economic or scientific changes;
- recent advances in educational research and educational paradigms;

(iv) Possible future directions for curriculum change.

5.2.2 Evaluation as Comparing Objectives and Outcomes

Learning outcomes are broad objectives that explain what the learners are supposed to know or be able to do and may be based upon the following:

- The requirements of the learner
- The requirements of society
- What the learner should be aware of a specific subject

As learning outcomes are broad objectives, they are stated in common terms. For instance, 'the learner will become well-known with the main forms and conventions of medieval literature' or 'the learner will build up a general understanding of hydrocarbon-bearing formations' are both logical learning outcomes. However, learning outcomes like these cannot be observed, gauged or evaluated on their own. Each learning outcome, therefore, must be supported and described by one or more particular objectives.

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Objectives are the chief building blocks of good quality curriculum design. They sustain the learning outcome in that each is a small step in arriving at what the learner is presumed to know or be able to do. Objectives have the following traits:

- They define specific outcomes or competencies to be attained in terms of skills, content mastery, attitudes or values.
- They form the basis upon which to choose or design teaching materials, content or techniques.
- They offer the basis for deciding or assessing when the coaching purpose has been accomplished.
- They provide a structure within which a learner can put in order his efforts to complete the learning tasks.

Well-written objectives are cautiously worded. They involve qualifiers to limit the circumstances and terms under which the objectives are met.

5.2.3 Need for Evaluating Curriculum

Before knowing the technique to evaluate curriculum, we must know why we should evaluate any curriculum at all. The reasons help us understand why we need to evaluate the curriculum:

- Students may be discontented with the existing curriculum and methods of teaching
- Students are not attaining the desired goals set in the curriculum
- There is an alteration or change in the student market
- The professional anticipations could be changing, which consecutively calls for a amendment in the curriculum.
- Changes can also take place in the time and staff resources

The need to evaluate curriculum crops up because it is essential for both teachers and students to decide the extent to which their existing curricular programme and its working have generated positive and curriculum-wise appropriate outcomes for students. To evaluate curricular effectiveness, we must first recognize and explain the curriculum and its objectives and then verify its contents for correctness, totality, depth, relevance and quality.

5.2.4 Focus of Curriculum Evaluation

Evaluation is a word employed in various ways sometimes with imprecise and overlapping meanings (Lawton [Emeritus Professor at Institute of Education, London], 1973). It is much wider than that measurement. It is more basically concerned with determining on the value or worth completeness of a learning process as well as the efficiency with which it is being done. Curriculum evaluation refers to the procedure of studying the plus point or worth of some aspect, or the whole of a curriculum. Depending on the manner in which the term curriculum is defined, the focal point or objects of curriculum evaluation could comprise the following:

- Curriculum design
- Learning environment

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- Instruction Process
- Resources
- Materials used in instructional practice

It is also necessary to learn about the capability as well as the provision of the necessary teaching resources for example teaching aids, laboratories, library books and instruments (Wiles [an experienced educational consultant] & Bondi [a senior curriculum consultant], 1989). Curriculum evaluation is obviously a procedure by which we attempt to measure the value and usefulness of any piece of instructive activity which could be a logical project, or a piece of work under taken by or with students.

5.2.5 Purpose of Curriculum Evaluation

Education trains future generation to take their suitable position in the society. It becomes necessary that second-rate educational goals, substances and methods of teaching are not retained but up-dated in consonance with the advances in social cultural and scientific field. It is also significant to determine how different educational institutions and situations infer a given or approved curriculum. Therefore, there is a need for curriculum evaluation. Curriculum evaluation checks and reports on the excellence of education. Cronbach [an American educational psychologist] (1963) distinguishes the following three kinds of decisions for which evaluation is used:

1. **Course improvement:** Deciding what instructional material and methods are acceptable and where changes are required.
2. **Decisions about persons:** Recognizing the needs of the student for the sale of planning of instruction and grouping, acquainting the student with his own deficiencies.
3. **Administrative directives:** Finding out how good the school system is, how superior individual teachers are.

The objective of evaluation must be to answer questions of selection, adoption, support and value of educational matters and activities. It helps in recognizing the essential improvements to be made in content, training methods, learning experiences, educational facilities, staff-selection and progress of learning objectives. It also serves the need of the policy makers, administrators and other members of the society for the information about the learning system.

Subject Content

Subject content is organized collection of information. The information is more often than not structured into smaller units akin to records having fields and sub-fields. Records are compilation of fields, viz., author field, title field etc. Fields are compilation of data and sub-fields are data inside a field. For instance, in author field, forename, date of birth etc. may be sub-field.

Subject content is distinguished by the subject domain it covers. There are several databases developed in specific subject areas and services are generated employing these specialist databases. For example, 'Chemical Abstracts' is a well-known service based on the information resources in the field of chemistry. The key feature of

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subject databases is that its range is limited by the subject area it covers. Therefore, intensive work is needed at the data collection and evaluation phase. Some databases include a particular discipline for example engineering, art, science, etc. Some databases are more common in nature and/or cover various subject areas and are searchable by each of them.

Organization and Mode of Transaction

Let us now discuss the organization and mode of transaction.

Organization of curriculum: The previous section dealt with some of the important curricular concerns and imperatives in the context of educational priorities. While designing a school curriculum for the national system of education, it would be necessary that the guidelines for its formulation and its **transaction** are drawn keeping in view these concerns.

National curricular framework: The national curricular framework for elementary and secondary education is envisaged in the context of the National System of Education. The basic features and the main thrusts of the curricular framework are as follows:

(i) Emphasis on the development of human resources for the realization of the national goals of development.

(ii) Broad-based general education to all learners at the elementary (primary and upper primary) secondary stages.

(iii) A common scheme of studies for elementary and secondary stages.

(iv) The common core components comprising the following: the history of India's freedom movement; the constitutional obligations; content essential to nurture national identity; India's common cultural heritage; egalitarianism, democracy and secularism; equality of the sexes; protection of the environment; removal of social barriers; observance of the small family norm and inculcation of the scientific temper.

(v) Emphasis on defining Minimum Learning Outcomes (MLO) for each area of learning at all stages of education.

(vi) Provision for flexibility in terms of selection of content/components and learning experiences, which would facilitate the attainment of minimum learning outcomes laid down for each stage of school education.

(vii) Emphasis on child-centred and activity-based processes rather than the teacher-centred approach during the transaction of curriculum.

(viii) Recasting of the examination system and introduction of continuous and comprehensive evaluation that incorporates both scholastic and non-scholastic aspects of education spread over the total span of instructional time.

(ix) Establishment of appropriate machinery, such as a National Testing Service (NTS) for the selection, and the development of norms of comparable competence across the nation.

(x) Applicability of the curriculum to all learners, irrespective of their modes/channels of learning in order to ensure comparability of attainment and to facilitate horizontal and vertical mobility of the learners.

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(xi) Provision of essential facilities for effective **transaction of curriculum** in all schools/non-formal learning centres.

Minimum levels of learning: In order to bring about a broad commonality in the standards of education throughout the country, emphasis has been laid on the introduction of the norms of minimum levels of learning for each stage of school education indicated in terms of minimum learning outcomes to be attained by all the pupils in respect of each curricular area at each stage of school education. The minimum learning outcomes for each curricular area will have to be specified keeping in view the research findings regarding the mental ability of pupils at different stages of their development and the academic and physical resources that could be made available in the school for effective transaction of the curriculum.

The emphasis on defining the Minimum Levels of Learning highlights the importance of the integrative nature of learning-evaluation. Put differently, learning (development) and evaluation (assessment) have been construed as two inseparable aspects of the same phenomenon. It is futile to evaluate the progress of the learners towards the stated objectives unless it is ensured that conscious efforts have been made to provide adequate and appropriate learning experiences for growth and development. Thus, a major shift from evaluation (passing judgement) to learning (development in terms of desired objectives) has been advocated.

While emphasis has been laid on the introduction of the norms of minimum levels of learning and adoption of a common scheme of studies at different stages of school education, flexibility is envisaged in the selection of content and learning experiences as well as in the selection of strategy for curriculum transaction in order to make leaning more relevant to the needs and environmental contexts of the pupils and to allow scope for initiatives and experimentation on the part of the teacher, the school and the local educational authorities. A high degree of flexibility and local initiatives are envisaged in designing and introducing remedial and enrichment programmes and materials not only by the State educational authorities, but also by the individual schools and teachers to cater to the needs to slow and fast learners studying in the same class/grade in a school. However, the scope for flexibility in the methodology and approach to transaction of curriculum is not expected to be used for introducing differential courses or similar measures which would accentuate disparities in standards of education in different parts of the country.

Common core components

While the rationale underlying the school curriculum of a country reflects its socio-cultural and political ethos, its faithful transaction reflects the genius of its people. The search for national identity has been on since the resistance to colonization of the country began. This search has not ended yet.

National curriculum

As a matter of fact, it is more acutely felt now than ever before. Therefore, it is but natural that there is a strong plea for centring the curricular efforts for promotion of national integration and social fusion and cultivation of values as enshrined in the Constitution. Thus, an important aspect of the common core components is the emphasis on instilling a nationally shared perception and values and creation of an ethos and value system in which a common Indian identity could be strengthened.

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The ways and means have to be found out to introduce the common core components at all levels of school education. Some suggestions are offered to initiate action on the subject.

After the minimum learning outcomes and related general content are identified for each area of learning and for each grade, further scrutiny may be made to explore the possibility of infusing the specific core component with the theme.

Where such natural infusion is not possible, an attempt can be made to select new content for each of the ten components to be added as topics/units to each relevant subject. One can envisage cyclic development of a new course of study pertaining to each of the components. For example, a set of courses on the history of India's struggle for freedom can be developed for grades I to X, independent of other subjects.

On the other hand, it is also possible to integrate such content appropriately in the regular subjects included in the present scheme of studies.

An eclectic organization is possible by way of integrating clusters of components such as social science components or science components or moral value components and designing syllabi for different grades.

At the primary stage, core components could be integrated with language and environmental studies so as to make them a medium to develop appreciation of culture and perception of the individual, social and national identity through activities, songs, stories, reading material, plays, skits, etc.

At the upper primary stage, both infusion and unit approach could be adopted.

At the secondary stage, the elements of civics, economics and sociology may be identified in an integrated manner. In addition to the common core components, the integrated course could cover the content which would reflect the contribution of India in the field of science, astronomy, metallurgy, medicine, creative arts, etc. in the ancient, medieval and contemporary periods. The core components could be made more interesting through visuals and biographical notes of scientists and eminent Indians in different fields. However, while introducing the core components, it is necessary to ensure that the depth and coverage of information is kept at the appropriate level and does not increase the total information load beyond the existing level in different subjects. This could be done by reducing the content in some of the existing subject areas and properly blending the core components in the total scheme of studies as far as possible.

Tools, techniques and modes of evaluation

The method of evaluation used by schools has pretty much been the same, i.e., by paper-pencil tests. Since a long time, schools measure the student's progress through written tests. However, written tests are not always suitable for every area of learning. Therefore, there is a need to create a new technique which can assess the student's performance. The school needs to make a conscious selection from available tools and techniques. Some tools and techniques that can be used by school are as follows:

- Observation schedules
- Rating scales
- Interviews
- Oral communications
- Interest inventories
- Anecdotal records

The schools also need to make a conscious effort to de-formalize internal and external examinations. If schools introduce more informal means to evaluate the learner's experience, they will not only reduce the anxiety and fear experienced by the learners but in turn will enhance the process of learning at all stages. Learner achievements need to be evaluated by applying the principle of relevance and flexibility to curriculum development.

In school education, the primary stage of learning is regarded as a period of transition where the student begins learning through informal play activities with the help of organized and formal methods of teaching. The growth and development of young learners needs to be evaluated through similar informal and relaxed methods. In the initial stages of learning, no rigid and/or formal testing should be introduced. It is better that oral testing is used to assess the student's learning at the primary stage of education. By using oral testing, the development of basic skills can be evaluated in language, numeracy, health, nutrition and sanitation. It is very essential that the school provide periodic checkups to assess the physical, social and emotional growth of a child and this assessment also needs to be carefully documented. In a similar manner, psychomotor skills with respect to non-scholastic areas like work experience, education and physical education should be conducted and documented. Thus, with the assistance of informal and formal observations along with various tools and techniques, sufficient evidence of the student's growth and development needs to be collected to create profiles of the learners. Once the student reaches middle school, written tests need to be given more significance while retaining the tools and techniques used at the primary level.

CHECK YOUR PROGRESS

1. What do you understand by the term curriculum evaluation?
2. What are learning outcome based on?

5.3 TYPES OF CURRICULUM EVALUATION

The curriculum can be evaluated in different ways. These ways are thus called the types of curriculum evaluation, which can be discussed under the following headings:

Curriculum Product Evaluation: This implies revision of curricular materials available by the very people who have created this material. This can be done in various ways. P. Tamir (1985), a professor of Science Education at the Hebrew University of Jerusalem, categorized these as follows:

(a) Part-time school-based curriculum development

(b) National curriculum study organizations; within the structure of national curriculum development centres

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(c) Curriculum development done by the university teams

(d) Curriculum product evaluation is also conducted by local, state or national textbook selection committees, which also think about other instructional material.

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Evaluation based on external criteria: Curriculum can be evaluated based on external criteria related to the appropriateness of the material. Tyler (Tyler, Louise L., professor of Education, Emerita. Los Angeles) and Klein (M. Frances Klein is Eminent Scholar Visiting Professor at Jacksonville State University, Alabama) (1976) offer an excellent example of curriculum product evaluation employing pre-specified criteria. These criteria had a definite behaviourist orientation.

Their evaluation procedure uses the following characteristics:

- Specification of instructional objectives on which the material is based
- Appropriateness of the materials given the skills
- Background knowledge, age, ethnicity and socio-economic background of the intended students
- Adequacy of the teachers' manual for classroom application and for providing an explanation of the content selection, sequence and presentation

Brophy (Jere Brophy is University Distinguished Professor of Teacher Education at Michigan State University and a Fellow of the International Academy of Education) and Alleman's (Janet Alleman is a professor in Department of Teacher Education at the Michigan State University) work (1991), derived more heavily from research on teaching, provided a constructivist framework for the evaluation. The criteria they proposed for evaluation include:

- Goal relevance
- Appropriate level of difficulty
- Feasibility
- Cost effectiveness
- Multiple goals
- Motivational value
- Topic relevance

5.3.1 Formative and Summative Evaluation

The term formative suggests that the data collected for evaluated as been assembled during the development or formation stage in order to conduct revisions on the content. Formative evaluation may include determining:

- Who requires this programme? (At what level should this programme be taught?)
- What is the necessity of this programme? (Are students required to learn a particular skill?)
- How to meet the need? (How to introduce a subject?)

In the field of education, formative evaluation is used to access information to enhance a programme.

In case of formative evaluation, experts make their evaluation on the basis of the following:

- Instructional strategies and materials used
- Learning outcomes
- Objectives that it wants to achieve

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For instance, in certain cases a curriculum plans a learning outcome however the learning activities do not match. The main function of a curriculum is to help students apply critical thinking however if there are no suitable learning activities to provide opportunities for students to practice critical thinking. Therefore, formative evaluation by experts will only be beneficial if done before the programme starts. After evaluation, a review done by the panel of experts may help in modifying and revising selected strategies.

In formative evaluation, on some occasions, learners may also be included to review the content material to check the usability of the material. For instance, if the required prerequisites are available, the students will be motivated to learn. Formative evaluation also helps to pinpoint problems like spelling errors, errors in sequence of content, inappropriate examples or illustrations. Feedback that is obtained could be used to revise and enhance instruction. It can also help in deciding whether they programme should be implemented or not.

In summative evaluation, data is collected after the implementation of the curriculum programme. This type of evaluation can take place right after a new course material is introduced, i.e., to evaluate the effectiveness of the programme or at a later stage when the students have gone through the new course material. In summative evaluation, it is essential to state the specific questions that need to be answered in the evaluation and what decisions will be made as a result of the evaluation. The evaluation will also find out if the learners have achieved the objective of the programme and whether the programme has produced the desired results. For example, the use of simulation software for geography class that increases the decision-making skills of learners. With the help of formal assessment and the marks obtained by students in these formal assessments one can determine the outcome of the programme. Summative evaluation can also determine if the innovation was:

- Cost effective
- Efficient in terms of time taken
- Unexpected outcomes

Student's performance will determine the level at which the students met the specified objectives. In this type of evaluation, data can also include qualitative interviews, direct observations and document analyses.

5.4 TOOLS AND TECHNIQUES OF CURRICULUM EVALUATION

In order to conduct a curriculum evaluation, the following conditions are essential:

- The process of learning should centre on a particular curriculum programme or contrast two-three programmes simultaneously.

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- The evaluation process should take place through a standard method
- The curriculum that is being evaluated needs to be reviewed in detail

Prior to evaluating the curriculum, the data needs to be assembled and decisions need to be made as to how the evaluation will be conducted. There are three stages of evaluation that will be followed while evaluating a curriculum:

(i) Articulating of programme theory
(ii) Selecting research design and methodology
(iii) Other considerations

Articulating of programme theory

- Prior to evaluation, the evaluation questions need to be decided and articulated. At this stage the components used in the evaluation process need to be determined as well.
- In order to articulate the diverse curriculum programmes, the evaluator needs to focus his techniques on different principles and consider different viewpoints to reach a suitable conclusion.
- Student behaviour and role in class needs to be closely monitored, especially the methods and strategies applied by them in problem solving.
- A learner's growth and development also needs to be measured. The evaluator also needs to check their proficiency over current and preceding topics.
- An informed judgment can be made by the decision makers after a comprehensible articulation of the curriculum takes place.

Selecting research design and methodology

There are three methodologies to evaluate curriculum, which are as follows:

(a) Content analysis
(b) Comparative study
(c) Case study

Features of Content analysis

- The evaluation under content analysis is highly influenced by the personal values of the concerned people who are responsible to conduct the evaluation.
- Curriculum analysis should not be limited to simply defining the content. The content also needs to be compared with other curricula.
- A balance needs to be established between the course content and the set objectives.
- The study material should aim to enhance student thinking and promote use of logical reasoning in real life incidents.

Features of Comparative study

- Decisions regarding the selection of relevant variables are taken to help make a comparative study of two or more curricula.

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- This type of analysis will identify the effect of the curriculum
- Making a comparative analysis of two or more curriculum programmes helps to decide whether the curriculum that has been finalized is properly designed and implemented.

Features of a case study

The main function of case studies is to interpret and identify the complex factors that influence and affect curriculum implementation.

An effective case study depends on the acquired data, student observation and by interviewing the people involved in the programme.

Other considerations that need to be followed:

- The evaluators should be able to comprehend the curriculum designers' point of view and at the same time the evaluators should be able to independently take decisions to ensure objectivity and fairness.
- The factor of time should also be taken into consideration while the evaluation process takes place. Evaluators need to ensure that there is a sufficient timeframe for the implementation of the curricula.
- It is of utmost relevance that emphasis is given on meta-analysis and the accumulation of knowledge during the evaluation of the curriculum.

5.4.1 Outcome of Curriculum Evaluation

The ultimate objective of evaluation is to bring about qualitative improvement in education. Therefore, evaluation should be construed as a powerful instrument for improving teaching and learning. Instead of using it mainly as a grading device, it should be used more as an effective feedback mechanism for the benefit of the learners, teachers and parents so that timely corrective and remedial measures could be taken to ensure that the Minimum levels of learning laid down are attained by one and all learners. Retrieval of such feedback should be of immense use to the concerned agencies for the introduction of concomitant changes in instructional materials and methodology of teaching. Evaluation should also help in improving the organization of external examinations. Finally, in the long run, as suggested by the Education Commission (1964–66), it should help determine and gradually raise standards of attainment at the State and National levels.

While the purpose devaluation should be diagnostic, that is, to ascertain strength and weaknesses of the learner, it should be predominantly so at the elementary stage of school education. Since a majority of the learners quit school at the end of this stage, the school system must ensure that the learner is fully equipped with knowledge, concepts/ideas, attitudes and values expected from a good citizen of the country. It, therefore, necessitates that more emphasis is laid on development and assessment of basic skills (competencies) and desired attitudes and values rather than rote memorization of information from books.

5.4.2 Change and Refinement of Content

Content refinement depends on the following main factors:

1. Clean and normalize content to attain the best probable relevancy throughout query time

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2. Normalize content – ideally data (particularly structured data) – should be reliable and without duplication
3. Appreciate that intake of content will be affected by the quantity and number of different types of data, as well as the latency of the source systems
4. Optimize document processing – take away all needless document processing components and choose the right workstation for the content type and task at hand
5. Marry content with the suitable document processing – language detection, synonyms, spell checking, lemmatization, taxonomy classification, custom plug-ins, etc.

Finest practices in content development include the following:

- **Planning ahead**: It refers to deciding which content requires to be prepared, by whom and at what excellence level. You require to factor staff-driven processes into your resources, work and time approximations.
- **Aiming to increase relevancy**: It implies that people use a search platform to find the information they need only when they require it. Focus efforts on increasing the relevancy of the results returned.
- **Normalizing content**: Ideally, data (particularly structured data) should be consistent and without duplication.
- **Logically separating multi-lingual and localized content**: this can be done by isolating documents on a per-site or language basis.
- **Striving to normalize acronyms**: This can be with no trouble by expansion in the search system, i.e., IBM ! I.B.M ! International Business Machines.
- **Automating where possible**: Since information is generated and consumed at incredible rates, its automation should be done as and when possible. One can use automated research tools to save time and decrease error rates.

5.4.3 Curriculum Revision

The final stage in evaluating a curriculum involves trying to find out whether the course or curriculum was successful by means of a linked process of assessment and evaluation, and then using the feedback thus obtained to improve and refine the course or curriculum by going round the cycle once again.

Defining assessment and evaluation

At this point, it would probably be useful to explain exactly what do we mean by the terms assessment and evaluation. Although we tend to use the two terms synonymously, they have different connotations when used in an educational or training context.

> 'By assessment, first of all, we mean those activities that are designed to measure learner achievement brought about as a result of an instructional programme of some sort.'
>
> 'Evaluation, on the other hand, refers to a series of activities that are designed to measure the effectiveness of the instructional system or a section or component thereof.'

The two processes do have a lot in common. We assess the learning outcomes and we evaluate the success of the curriculum on the basis of how the objectives in the curriculum have been specified and achieved. Indeed, one cogent argument for

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articulating the desired educational outcomes of a course or curriculum in fairly detailed (preferably behavioural) form whenever possible is that this is generally of considerable assistance both in assessing the students and in evaluating the course or curriculum, since the designer should, as a result of writing the objectives/learning outcomes in this way, have a fairly clear idea of the behaviour that is to be measured. Conversely, the feedback obtained from the results of properly-designed assessment and evaluation procedures often demonstrates a need for changes in the objectives or learning outcomes of the course or curriculum, as well as in the methods adopted for trying to achieve these.

A curriculum can be evaluated by the results that it claims to achieve and the teachings that it inculcates in the students. One can look at the following factors while evaluating a curriculum:

- Does the curriculum support students to use their own way of thinking to find answers to real-world problems in a more creative and practical way?
- Does it offer them practical information about the subject being taught?
- Does it help students to take up lateral thinking and form their outlooks about a certain topic or concept?
- Does the curriculum groom their personality?

Things to be kept in mind when revising the curriculum

Curriculum revision can be a fulfilling experience provided we keep in mind the faculty involvement, resources and stakeholder expectations. A curriculum revision can be a rewarding experience. The following things should be kept in mind when revising the curriculum:

1. **Faculty involvement:** The faculty of the programme have valuable information about the programme. For example, they know the type of students in the programme and their learning abilities. Faculty also know the course content and, in many cases, know the weaknesses of the courses. Their input into the process of curriculum revision is very valuable, but many of them may be resistant to change – especially when they feel 'their course' is threatened. Leaving faculty out of the curriculum revision process invites resistance to the proposed changes.
2. **Consider why a change is necessary:** There are many reasons why a curriculum may need to be revised. Changes in resources, changes in the material covered and changes in faculty are just a few of the causes of need to revise a curriculum. However, consideration must be given to changes other than curriculum changes that could fix problems within a programme. In order to do this it is important to collect data that quantifies the need for change. Courses can be redrafted, interrelated to other course by using this data.
3. **Have a plan:** When the decision has been made to consider curriculum revision, a plan must be formulated and the goals of the revision must be stated. The first step is to decide who is going to oversee the revision. It is also necessary to get a committee to collect information. Designing surveys, distributing them, reviewing the suggested changes in relation to other curriculum and using the data to commence the revision process are important activities. Once a determination to revise a programme has been made, an agreement as to the goals of the revision must be determined. This could relate to decisions, to reduce

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the number of hours in the curriculum, include concentrations in the curriculum, eliminate courses and update the content of the curriculum.

4. **Consider requirements of accreditation agencies and government:** When revising a programme, consideration must be given to the guidelines provided by accrediting agencies. **'Principles of Accreditation: Foundations for Quality Enhancement'** that the government has prescribed must be kept in mind. This sometimes makes it mandatory for the curriculum revision team to retain broad heads of topics. They may be reduced in content or added on in content but it may be mandatory to include the specified content.
5. **Consider stakeholders:** Stakeholders are an important source of information about the needs of a programme. Students, alumni, faculty and employers should be allowed to provide their insights into the needs of the programme. For example, the survey results of a particular programme indicated that the alumni and faculty indicated a particular course contained too much material on one aspect and not enough material on another important aspect. The result of this weakness was the modification of the course; however, the entire curriculum did not need to be revised.
6. **Consider what other programmes are doing:** It is important to conduct a benchmarking study of peer programmes, competitor programmes and aspirant programmes. Information collected can be used as a starting point for discussion. This helps ensure that the revision is not done in isolation and has relevance to similar programmes running in the state or country.
7. **Consider the resources available:** When revising the curriculum, it is important to review the availability of the resources for the revised programme. These resources could include faculty, finances, technology resources, etc.
8. **Consider assurance of learning goals:** It is important to address the learning goals for the programme. It is necessary to develop rubrics clarifying the need for change. There should be systematic processes to develop, monitor, evaluate and revise the substance of a course. Learning outcomes and objectives must be clearly spelt out. It is also necessary to imbed assurance of learning goals and measurement within the revised courses.
9. **Consider compromise:** Every member of the faculty will have his or her concept of the ideal programme. Unfortunately, each of these concepts differs. In order for a curriculum revision to succeed, many compromises must be made. All the members would have to arrive at compromises and ultimately decide on what is best for the course in question and for the students impacted in particular.
10. **Remember it will change:** Change has today become the only constant feature of any endeavour and it would be good for us to remember that in spite of the revision that may have been undertaken, there may still arise a need for change and we need to be prepared for that.

By keeping these warnings in mind, a curriculum revision can be a rewarding and productive endeavour. A new curriculum can meet the needs of a programme. The change in the curriculum can bring added enthusiasm to the faculty, and a new approach can address stakeholders' needs.

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CHECK YOUR PROGRESS

3. Give an example of a product of curriculum.
4. What is the characteristic of 'Learning Objectives'?
5. What is the main condition to evaluate curriculum?
6. What is meant by 'output evaluation'?

5.5 SUMMARY

- Objectives are the chief building blocks of good quality curriculum design. They sustain the learning outcome in that each is a small step in arriving at what the learner is presumed to know or be able to do.
- Curriculum can be evaluated based on external criteria related to the appropriateness of the material.
- The first step for evaluation is to state and articulate the evaluation questions and explain what components will be considered in the evaluation process.
- The evaluator must be able to understand the thought process of the curriculum designers and their thinking behind setting the goals and objectives, and at the same time, be independent enough to ensure objectivity and fairness.
- Education trains future generation to take their suitable position in the society.
- In order to bring about a broad commonality in the standards of education throughout the country, emphasis has been laid on the introduction of the norms of minimum levels of learning for each stage of school education indicated in terms of minimum learning outcomes to be attained by all the pupils in respect of each curricular area at each stage of school education.
- The principles of relevance and flexibility applicable to curriculum development need to be followed in evaluating the attainment of the learners.
- The final stage in evaluating a curriculum involves trying to find out whether the course or curriculum was successful by means of a linked process of assessment and evaluation, and then using the feedback thus obtained to improve and refine the course or curriculum by going round the cycle once again.
- When revising the curriculum, it is important to review the availability of the resources for the revised programme. These resources could include faculty, finances, technology resources, etc.

5.6 KEY TERMS

- **Curriculum evaluation:** It is the method by which we attempt to measure the value and effectiveness of any specific educational activity regarding the student who takes part in it.

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- **Learning outcomes**: These are broad objectives that explain what the learners are supposed to know or be able to do.
- **Content:** It refers to the subject matter of a book, speech or programme.
- **Education:** It refers to a process of teaching, training and learning, especially in schools or colleges, to improve knowledge and develop skills.

5.7 ANSWERS TO 'CHECK YOUR PROGRESS'

1. The term curriculum evaluation has been used in various terms of reference. Some writers have used curriculum evaluation to refer to curriculum product evaluation; others use the term in reference to curriculum programme evaluation.
2. Learning outcomes are broad objectives that explain what the learners are supposed to know or be able to do and may be based upon the following:
   - The requirements of the learner
   - The requirements of society
   - What the learner should be aware of a specific subject
3. A textbook is an example of a product of curriculum.
4. 'Learning Objectives' define specific outcomes or competencies to be attained in terms of skills, content mastery, attitudes or values.
5. To evaluate curriculum, the main condition implies to focus on the gathering the data and the decisions that must be made for appropriate evaluation.
6. 'Output evaluation' implies evaluating the direct effect of the programme. This could include a number of variables like the number of students who successfully complete the course, the changes in their knowledge, attitudes, practices and the grades they get.

5.8 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What is the meaning of curriculum evaluation?
2. How is the National Curriculum Framework developed?
3. What are the tools, techniques and modes of evaluation?
4. How is content refined?

Long-Answer Questions

1. Discuss the types and models of curriculum evaluation.
2. Describe the organization and mode of transaction with regard to curriculum evaluation.
3. Explain the difference between assessment and evaluation with the help of examples.
4. What needs to be kept in mind while revising the curriculum.

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5.9 FURTHER READING

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UNIT 6 MODELS OF CURRICULUM DESIGN AND EVALUATION

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Structure

6.0 Introduction
6.1 Unit Objectives
6.2 Models of Curriculum Development
- 6.2.1 Ralph Tyler's Model of Curriculum Development (Administrative Approach)
- 6.2.2 Hilda Taba's Model (Grass-Root Approach)
- 6.2.3 D. K. Wheeler's Model of Curriculum Development
- 6.2.4 System Analysis Model

6.3 Models of Curriculum Evaluation
- 6.3.1 Scientific Evaluation Models of Metfessel and Michael
- 6.3.2 Provus Discrepancy Evaluation Model (DEM)
- 6.3.3 Humanistic Model of Stake's Responsive Evaluation Model
- 6.3.4 Parlett and Hamilton Evaluation Model
- 6.3.5 Context, Input, Process, Product Model (CIPP Model)
- 6.3.6 Eisner's Connoisseurship Model
- 6.3.7 Scriven's Goal-free Model
- 6.3.8 Tyler's Objectives-centered Model

6.4 Summary
6.5 Key Terms
6.6 Answers to 'Check Your Progress'
6.7 Questions and Exercises
6.8 Further Reading

6.0 INTRODUCTION

Curriculum designing is the well-organized preparation of what is going to be instructed in schools at a given time in a given semester. They are official documents, as they guide the teachers and students alike. They are made obligatory by central and state educational departments. All schools and teachers are provided a particular curriculum for implementation in schools by the educational boards.

These days, a regular re-examination of the prescribed curriculum is done so that the best possible experiences can be provided to children by schools. These experiences help them to cope with technological, social, economic and political changes taking place in the society. In this unit, principles of curriculum designing have been discussed. In addition, models of curriculum development have also been explained.

6.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Describe the models of curriculum development proposed by Ralph Tyler, D. K. Wheeler, Hilda Taba and System Analysis
- Discuss the models of curriculum evaluation by Matfessel-Michael, Provus, Stake and Paclett and Hamilton's Evolution Model

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6.2 MODELS OF CURRICULUM DEVELOPMENT

Curriculum design refers to how we conceptualize the curriculum and arrange its major components to provide guidance and direction as one develops the curriculum.

Curriculum model refers to a plan of action that can be employed to structure a subject or knowledge area from a theory into practice. Let us discuss some of the main models on curriculum development.

6.2.1 Ralph Tyler's Model of Curriculum Development (Administrative Approach)

Ralph W. Tyler (1902–1994) was an US educationist who worked in the sphere of assessment and evaluation. He was the advisor to a number of bodies that established guidelines for the expenditure of federal funds and influenced the fundamental policy of the Elementary and Secondary Education Act of 1965. Tyler chaired the committee that finally developed the National Assessment of Educational Progress (NAEP).

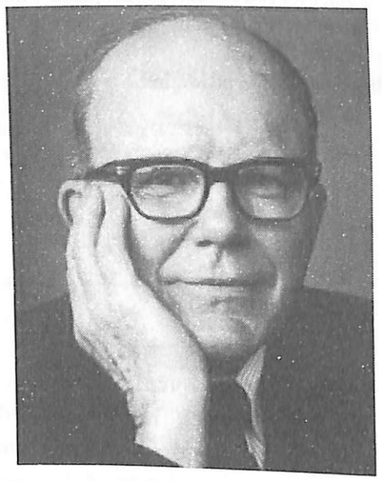


Fig. 6.1 *Ralph Tyler*

Tyler formalized his reflections on viewing, analyzing and interpreting the curriculum and instructional programme of an educational organization in his book named *Basic Principles of Curriculum and Instruction* (1949). The book described a deceptively simple structure for delivering and evaluating instruction comprising the following four parts that were famous as the *Tyler Rationale*:

1. What educational purposes should the school seek to achieve? (Defining appropriate learning objectives.)
2. How can learning experiences be chosen which are likely to be useful in achieving these objectives? (Introducing useful learning experiences.)
3. How can learning experiences be organized for successful instruction? (Organizing experiences to maximize their effect.)
4. How can the effectiveness of learning experiences be evaluated? (Evaluating the process and revising the areas that were not effective.)

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Tyler's achievements

Tyler's achievements can be summed up as follows:

- Tyler advised President Truman on reforming the curriculum at the service academies.
- In 1952, under Eisenhower, Tyler chaired the President's Conference on Children and Youth.
- The Johnson Administration used Tyler's advice to outline many of its education bills and programmes.
- Tyler was named founding director of the Center for Advanced Study in the Behavioral Sciences in 1954 and held that position through 1967.
- As a member of the governing board, Tyler is credited with playing a significant role in determining the character of the center as a new type of educational institution.
- In 1964, the Carnegie Corporation asked Tyler to chair the committee that would finally develop the National Assessment of Educational Progress (NAEP) in 1969.
- Tyler also contributed to the following educational agencies
  - o The National Science Board
  - o The Research and Development Panel of the U.S. Office of Education
  - o The National Advisory Council on Disadvantaged Children
  - o The Social Science Research Foundation
  - o The Armed Forces Institute
  - o The American Association for the Advancement of Science
- Tyler also served the Association for Supervision and Curriculum Development (ASCD) and helped publish its *Fundamental Curriculum Decisions* in 1983.

Key aspects of Tyler's research

The following are the key aspects of Tyler's research on curriculum development:

The nature and structure of knowledge

These are as follows:

- Selection of subject matter
- Organization of subject matter and discipline
- Theoretical basis of methods and approaches

Curriculum development process

It depends on the following:

- Philosophy of education
- Goals and aims
- General instructional objectives
- Specific instructional objectives and outcomes

- Task analysis and content selection
- Learning activities

Selection of subject matter

The subject matter is selected on the following grounds:

- **Criteria:** Relevance, importance, priority
- **Scope:** Amount, depth of coverage, concentration
- **Sequence:** Hierarchy and progression of complexity or difficulty

Organization of subject matter

The subject matter should be organized on the basis of the following factors:

- Discuss subjects or courses
- Broad fields or disciplines
- Core or interdisciplinary
- Skills and processes
- Projects and activities

Approaches to subject matter: For better understanding of the subject matter, the following aspects can be checked:

- Textual
- Experimental
- Developmental
- Psycho-social
- Experiential

Needs of the learner

A student or learner has the following needs:

- Cognitive development
- Linguistic development
- Psycho-social development
- Moral/affective development
- Vocational focus

6.2.2 Hilda Taba's Model (Grass-root Approach)

Although Ernest Hemingway once stated that in each port of the world you could meet at least one Estonian, it is a rare occurrence when the existence and achievements of great personalities originating from this 1 million strong nation are associated with their native country and nation in the minds of their foreign colleagues. In this sense, Hilda Taba is not an exception. She is known worldwide as an outstanding US educationalist and curriculum theorist, but very few know that she was born, brought up and educated in Estonia. Probably, even more surprising is the fact that Taba, belonging to the list of the most outstanding educators of the twentieth century and whose academic work

climaxed with the publication of the monograph *Curriculum Development: Theory and Practice* (1962), remained unknown in her native country for decades. Therefore, in spite of the fact that Taba's approach to curriculum design spread throughout the world and her monograph took an honourable position on the bookshelves of European education libraries in the 1960s, her educational ideas reached Estonian educators only at the end of the 1980s.

The above-mentioned circumstance is one of the many controversial aspects in Hilda Taba's life that evidently played an important role in her development as a scientist and gave a unique colouration to her educational ideas. Another controversy, undoubtedly playing a major role in the formation of Taba's theoretical ideas and thinking, was the collision between German and American educational traditions that she experienced in her studies of pedagogy. For instance, the undergraduate educational preparation that she received at the University of Tartu had a strong disposition towards German didactics and educational philosophy. However, her subsequent post-graduate studies in the United States of America were strongly influenced by the ideas of progressive education, which she came to admire and which became a cornerstone of her educational thinking.

It remains unknown whether Taba had dreamed of pursuing her academic career in the United States or of returning to Estonia after her post-graduate studies abroad. However, the fact that she competed for the professorship in education at the University of Tartu in 1931 rather points to her intention to bind her working career and life to Estonia. These plans did not come about, as she was not selected for this position. But what is even more amazing was that she could not find any other job in Estonia worthy of her qualifications. So, the author of the doctoral dissertation *The dynamics of education: a methodology of progressive educational thought* (1932), which later earned wide recognition among educators, decided to return to North America. This unexpected change in her plans and the subsequent move caused Taba to experience serious difficulties and misery at the beginning of her career. Hilda Taba's road to excellence was in some parts due to chance, her enormous desire to succeed and the favourable conditions for educational research in the United States, and she became one of the brightest stars in the educational constellation of the 1960s. Nowadays, her work in the field of curriculum design, alongside that of Ralph W. Tyler, belongs to the classics of pedagogy. Several contemporary authors still frequently refer to Hilda Taba's ideas and base their work in the field of curriculum theory and practice on her conceptions developed decades ago.

There are over 100 recent articles and monographs referring to the work of Taba in the Education Resource Information Center (ERIC) database. Furthermore, countless references to her name and educational ideas on the Internet are additional proof that her academic contribution to the field of education has lasting value.

Some ideas about Hilda Taba as a person can be found in Elizabeth H. Brady's (1992) commemorative article. Brady, one of her closest colleagues during the days of inter-group education projects (1945–51), wrote: 'Taba was very energetic, enthusiastic, active, seemingly tireless; she led life at a tempo which sometimes led to misunderstandings and often wore out friends and staff. She was small in stature, perky in manners and in dress and always intent on the next thing (Brady, 1992, p. 9).'

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Hilda Taba (Figure 6.2) died unexpectedly on 6 July 1967, at the peak of her academic capabilities and power.



Fig. 6.2 Hilda Taba

Some of Taba's philosophical ideas on curriculum development

There are many academic papers in English and in Estonian describing Hilda Taba's ideas and research on specific areas of education. But there are fewer writings on Taba's general principles and beliefs regarding research and education that made her work unique, inventive and original.

Many of the ideas that made Taba world famous kept developing and evolving gradually throughout her career. A preliminary, and therefore incomplete, analysis of her scientific heritage suggests at least four principles that seem to govern her vision of curriculum theory and curriculum development (Krull & Kurm, 1996, p. 11–12):

1. Social processes, including the socialization of human beings, are not linear, and they cannot be modelled through linear planning. In other words, learning and development of personality cannot be considered one-way processes of establishing educational aims and deriving specific objectives from an ideal of education proclaimed or imagined by some authority.
2. Social institutions, among them school curricula and programmes, are more likely to be effectively rearranged if, instead of the common way of administrative reorganization—from top to bottom—a well-founded and coordinated system of development from bottom to top can be used.
3. The development of new curricula and programmes is more effective if it is based on the principles of democratic guidance and on the well-founded distribution of work. The emphasis is on the partnership based on competence, and not on administration.
4. The renovation of curricula and programmes is not a short-term effort but a long process, lasting for years.

The principle of considering social processes as non-linear is the most important one, and it probably governs all of Hilda Taba's educational work. Taba pointed out already in her doctoral dissertation that 'ends and aims, as they are in actual life,

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seldom present themselves as simple and easily comprehensible units' (1932, p. 142) and, therefore, 'a purposive act must be regarded primarily as an outgrowth of previous activity and not as an independent unit starting and activating because of some end or purpose clamouring for actualization' (1932, p. 143). Applying the principle to curriculum design, this means that it is unreal and impossible to set up rigid general goals of education from which more specified objectives would be derived for a concrete plan. The general goals are also subject to modification in order to become adapted to the real circumstances, whereby they are dependent more or less on the content and character of the educational step planned.

The second principle of the efficiency of the bottom-up approach suggests the most convenient way to help individuals and human social organizations to accept and to adapt to new situations and ideas. Taba's view can be well interpreted in the light of Donald Schön's concept of 'dynamic conservatism' (Schön, 1971), which expresses the tendency of individuals and social organizations to oppose energetically changes that derange or offend their convictions and understandings by building up structures and mechanisms that will interfere with these changes.

The expected changes in the individual or social consciousness will take place only if individuals or groups, under pressure to introduce these changes, conserve or acquire the ability to learn. So, the changes and learning underlying it take place more easily, and meet less opposition if they are not imposed by the central institutions but are initiated in the periphery, and gradually spread all over the structure.

The third and fourth principles underline the necessity for the democratic guidance of curriculum development and the long-term nature of this process, and are essentially derived from the first two principles. They are explicitly spelled out in the description of the organization for social studies curriculum development used in Contra Costa County.

Source: *Text on Hilda Taba has been adapted from UNESCO: International Bureau of Education website: http://www.ibe.unesco.org/fileadmin/user_upload/archive/publications/ThinkersPdf/tabae.pdf*

The Taba-Tyler Model: A Comparison

Tyler's model is deductive, while Taba's is inductive. Tyler's approach was administrative, while Taba's model reflects the teacher's approach. The spirit of Tyler's model is that administration should design the curriculum and the teachers should implement it. Taba believes that the teachers are aware of the students needs; hence they should be the ones to develop the curriculum and implement in practice. The **grass-roots approach is** another name for Taba's apprach. Taba believes that the demand for education in a particular society should be studied first. She also pays attention to the selection of the content and its organization with the objective of providing students with an opportunity to learn with comprehension. She was against the higher authorities dictating the curriculum to the teachers. She also believed curriculum was best designed inductively, starting with specifics and building up to a more general design. Tyler put emphasis on aims, evaluation and control. This approach may be perfect, perhaps, for market-oriented education. However, it was not adequate for the development of responsible and creative individuals capable of meeting the challenges of the ever changing circumstances. Many educational systems today, using Tyler's model, have come to crises and require reforms based on a totally different model of curriculum development.

6.2.3 D. K. Wheeler's Model of Curriculum Development

D. K. Wheeler stated that curriculum refers to the planned experiences provided to the learner under the guidance of the school. E. Eisner mentioned that 'the curriculum of a school, or a course, or a classroom can be conceived of as series of planned events that are intended to have educational consequences for one or more students.' In 1967, Wheeler came up with a cyclic model of curriculum process (Figure 6.2) going through the following five phases:

- Aims, goals and objectives
- Selection of learning experiences and Selection of content
- Organization of integration of learning
- Experiences and content
- Evaluation

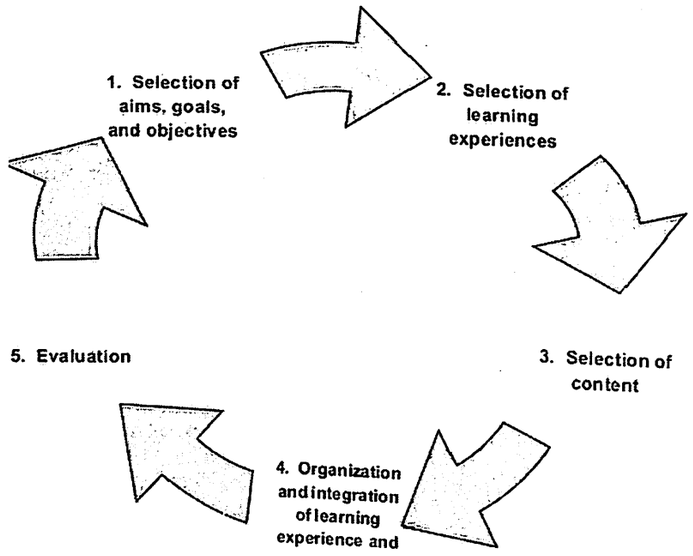


Fig. 6.2 Wheeler's Cyclic Model of Curriculum Development

6.2.4 System Analysis Model

System Analysis is closely related to training psychology and cybernetic. It emerged during the Second World War and has greatly influenced the decision making of the management in business, industry, government and military. Over the period of time, System Analysis has gained considerable standardization.

Meaning of System Analysis

The word system has been derived from the field of engineering. A system is when agents work independently and dependently together to achieve the required goals. The term 'system' conveys the meaning of analysis and development. The term, 'system analysis' has emerged from the scientific management concept. It involves utilization of scientific mathematical techniques in organizational operation as a part of decision-making activities of the management. It assumes that no comprehensive system development can take place without prior system analysis. It helps administrators to use scientific and quantitative methods for analysing management problems. System technology brings to educational management a scientific-quantitative approach for solving complex educational administrative problems.

Procedure of System Analysis

For conducting system analysis study, the following steps must be followed:

1. **Formulation of objectives:** To state objectives in general terms an objective may be written in behavioural terms of fiscal functions.
2. **Review of System operation:** System analysis is problem-oriented and includes a comprehensive review of the system operation. Comprehensive review of the whole system is necessary to isolate the main problem to the solved.
3. **Collection of data:** It involves the statistical techniques and procedure.
4. **Analysis of data:** It is done to make the matter meaningful and is employed to experimental paradigms to study the effect of independent variable.
5. **Isolation of the problem:** It is necessary to follow the above steps in order to isolate specific problem of the system. The collection and analysis of data helps in identifying and defining the problem.
6. **Specify operations in the problem:** It is much more comprehensive than the original review of the total operations. It helps to understand the relationship of all facts of the problem to the total operation system.
7. **Block Diagram:** In the final step in the analytical stage of the system analysis, a block diagram is prepared for all functions of the sub-system that make up problem area. It denotes logical structure of the sub-system operations and similar to the block diagram.

Design

After the system analysis, the investigator attempts to design a tentative solution to the problem. The new solution is subjected to testing. A tentative solution and retesting the tentative solution continues until an analyst reaches to an optimal solution. Once the optimal solution is obtained, the analyst departs from the loop.

Evaluation

A formal evaluation of the new solution is done for checking its workability. The evolution involves implementation of tentative solution. It is best to evaluate all new system solutions in small scale.

System Operations

It involves two aspects:

- Implementation of new system operation
- Maintenance of the system where a new system is designed

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Criteria for Evaluating System

The total system should operate in an optimal fashion and has some criteria. These criteria are as follows:

- **Performance:** Performance forms the basis of the effectiveness of any system. The design of the problem solution ascertains the effectiveness of new system in achieving the objectives. The performance criterion is the concept of validity of the new system. The system is valid if it does what it is supposed to do. Therefore, most of the evaluation of the performance is quantitative.
- **Cost:** Analysis of system is influenced by the function of cost. The amount of resources put into the system function in terms of money, staff and facilities. This is a valuable criterion for evaluation system analysis of projects.
- **Utility:** The ultimate criterion for evaluating system project is utility of the system. Investment represents the utility of a given function. Many educational functions require an assignment of a numerical utility.
- **Time:** Time factor as an evaluative criterion is closely associated with effectiveness. There is high correlation between time and cost. Much of the contribution of modern electronic data processing involves time.

Application of System Analysis in Education

The purpose of system analysis is to get the 'Best environment in the best place for the best people, at the best time and in the best price.' The system approach in instruction is an integrated, programmed and a complex instructional media of hardware whose components are structured as a single unit with a schedule of time and sequential phasing. System analysis greatly influences educational administration and organization. It provides scientific and quantitative basis for studying the problems of educational system. The educational implication of system analysis has been found in the following areas of education:

- **Approach:** It brings to educational management a scientific-quantitative approach for solving complex education administrative problems.
- **Problems**: It enables educational administrator to identify the actual problem and abstains a verified solution of the problem.
- **Training:** The training programmes can also be improved with the help of system analysis. The new concept of management can be used in training programmes.
- **Sub-systems:** The sub-systems of education is analysed to understand the actual problem and tentative solutions can be verified or tested on a segment of the system.
- **Change**: Any change in the educational system can be brought objectively, empirically and economically with great utility with the help of System Analysis.

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CHECK YOUR PROGRESS

1. What is the source of Tyler's thoughts on curriculum development?
2. Which factors help in organization of subject matter?
3. According to Hilda Taba, when will the expected changes in the individual and social consciousness take place in the process of curriculum development?

6.3 MODELS OF CURRICULUM EVALUATION

Evaluation Research

The field of evaluation research has undergone noteworthy changes since the time of Tyler's work in 1949 due to current trends of receptive evaluation and qualitative research. Tyler, who is supposed to be the earliest writer in this field, was a supporter of objective-based evaluation. Other authors supported other kinds of measurement because they argued that the determination of objectives is, itself, subjective.

An effectual Curriculum Evaluation Model has the capability of doing the following:

- It can be brought into existence and use without making undue demands and burden upon the resources of the district.
- An effective model has the capacity of being applied to all levels of curriculum starting from programmes of study, fields of study and lastly to the courses of study.
- All noteworthy aspects of curriculum i.e. the written, the taught, the supported, the tested, and the learned curricula can be assessed by it.
- Able to clearly make distinctions between the intrinsic value and the worth i.e. value for a given context.
- Effective models are approachable by the stakeholders and are able to make the data available when it is required for decision making.
- They are goal-oriented and emphasize on objectives that were set.
- Is sensitive to and makes appropriate provisions for assessing unintended effects.
- Formative aspects are given due attention and provisions are made for assessing formative aspects of evaluation.
- Curriculum evaluation models should be sensitive to and make provisions for assessing the special context for the curriculum.
- Assessment of the aesthetic or qualitative aspects of the curriculum is well provided by them.
- Fulfils requirements for making assessment of opportunity cost—the opportunities lost by those who study this curriculum.

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- For gathering and analysing data both quantitative and qualitative methods are used.
- The current findings in reports are receptive to the exceptional needs of audiences.

Theories and Models

The writing about the evaluation research in education started with the efforts and work of Ralph W. Tyler. Tyler was strongly grounded in the scientific method and on this basis Tyler (1949) assumed that programmes should be evaluated exclusively on the basis of their ability to meet the objectives that have been set before. An objective is the result that a programme is trying to achieve. Tyler's writing inferred that evaluation should be carried out by outside experts. Though objective-based evaluation is still considered to be a fundamental method for conducting evaluation research, the opponents of Tyler are of the opinion that other methods may be better. This group of opponents, led by Eisner (1979), had this argument that objective based evaluation is often subjective, because the choice of objectives is a value-laden purposeful act. Not only his goal attainment model but other areas of Tyler's work also have come under disapproval. It includes the time period of evaluation as this limitation can cause the danger of allowing objective based evaluation. Opponents of Tyler developed many contrasting models of evaluation.

Tyler considered evaluation research to be a way of deciding whether the programme that has been implemented is meeting a set of predetermined criteria or not. Cronbach (1963) contradicted these intentions of Tyler, claiming that the centre of attention should be on improving the progress of new programmes, rather than waiting until the previous programme is in place. Evaluators should be asked to look into a programme midway through its implementation, for it is at this point that an evaluator can be most helpful in improving the programme.

The theories espoused by these leaders in evaluation research have led to the expansion of different other evaluation models. Popham (1975) characterized these models in four groups:

- Goal-attainment models
- Judgmental models emphasizing intrinsic criteria
- Judgmental models emphasizing extrinsic criteria
- Decision facilitation models

Goal Attainment Models

Fathered by Ralph Tyler in the 1930s, goal attainment or objective-oriented models still provide direction and assistance to many evaluations and occupy an important place in the literature. An example of a goal-attainment model is the paradigm developed by Metfessel and Michael.

6.3.1 Scientific Evaluation Models of Metfessel and Michael

It engages stakeholders as facilitators, formulates specific goals and objectives, translates the formulated objective into transmissible form, select/constructs instruments to aid determine programme efficiency, carries out intermittent observations, analyses data, interprets data, and develops recommendations.

The steps of their model are given below:

1. Members of the whole community directly and indirectly can be added up as the participants in the evaluation process
2. Developing of wider goals and specific operational objectives both cognitive and non-cognitive in nature
3. The objectives that are specified should be translated so that they are communicable and can be implemented to assist learning and makes a smooth progress
4. To check whether the programme has achieved the objectives that were specified earlier we should develop criterion measures and instruments
5. The programme should progress toward measuring the attainment of the objectives and finally proceed towards attainment of the objectives in the real sense
6. Next measure is to analyse the data
7. Interpretation of the data should be done based on standards and values
8. At the end, recommendations should be formulated for the improvement of programme as well as for revisions in the goals and objectives if required

Metfessel and Michael have been known better for the list of criterion measures than for their paradigm which is added to the article as the appendices. It can be used by the evaluator in the fourth step of the model. The measures mentioned by Metfessel and Michael are wide-ranging, with those for determining student behaviour including self-inventories, standardized tests, rating scales, projective tests, anecdotal records and case histories. In the evaluation system formulated by Metfessel and Michael measures are also provided for teacher and community behaviour.

Advantages of objective-oriented evaluation approach

- Simplicity of the programme
- Straight forward i.e. easy to understand
- Follows, implements and produces significant information

Criticism of the model by Metfessel and Michael

No programme is said to be a perfect model. Despite their several advantages, there are number of criticisms of goal-attainment models.

- Scriven (1967) was the first to caution against arbitrary goal-based evaluation without an associated evaluation of the quality of the goals: In this reference he commented 'it is obvious that if the goals aren't worth achieving then it is uninteresting how well they are achieved.' It is unfortunate that many evaluators do not take note of Scriven's advice and the goals that are established for a programme often remain unscrutinized.
- Another drawback of the goal-based models is to provide an effective foundation for shaping programme results. For this the objectives of programme must be made clear and specific. Hardly ever the evaluators afforded the comfort of explicit programme goals. Even if the programme objectives existed they were unclear, common, and too broad to provide a foundation for comparing results.

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- A very common criticism of goal-based evaluations is that it focuses its attention only on the results of the programme, provisions of its proposed objectives which narrows the evaluation in such a way that the different measures used to achieve the results and their relationship to programme outcomes are uncared for. Concerning the judgement of overall value of the programme as far as its success in achieving the objectives is concerned, global judgments of merit can be made but no basis for programme improvement is provided by the data though it is equally an important part of evaluation. In other words, the goal-attainment model is not decision oriented; only limited information can be provided for decision makers.

In decision-oriented models, the rationale of evaluation is to present information for the decision makers for a numbers of decisions to be taken like:

- Decisions concerning whether or not a program is required
- Whether the programme should to continued or needs to be expanded
- Whether the programme should be terminated
- Decisions is to made regarding program certification or licensing;
- Decision is required about the ways to be adopted for programme improvement

The next stated model is a decision-oriented model for programme evaluation and point of reference that is obvious in the definition of evaluation that provides the conceptual base for its development.

6.3.2 Provus Discrepancy Evaluation Model (DEM)

It was developed in the year 1966 by Malcolm Provus and is regarded as a *Systematic Approach for the Evaluation of Career Planning and Placement Programmes.* The Discrepancy Evaluation Model gives information for programme assessment and programme enhancement. Malcolm Provus' Discrepancy Model is a very popular model and gets its name so because the key point in the definition of evaluation given by Provus is based on the discrepancy between performance and standards. Under the DEM, evaluation is defined as the comparison of an actual performance to a desired standard. The DEM can be used as a formative assessment to decide whether to amend or stop a programme. The model is perfect for finding problems by ways of the discrepancy. It can also be used to design a programme from the time of its setting up to conclusion, leading to summative evaluations.

Evaluation has been defined by Provus as the process of

- Defining the standards of the programme
- Making it clear whether a discrepancy does exist between some aspect of programme performance and the standards governing that aspect of the programme
- If discrepancy exists then this information is used either to bring change in performance or to change programme standards

Having rested on the information yielded as a consequence of the evaluation done, there can be four possible decisions to be made.

- Programme can be ended
- Can be customized as per requirement
- Can continue or be repeated as is
- Standards can be changed

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Discrepancies are determined by examining the three content categories i.e. input, process, and output at every stage and then programme performance information is compared with the defined standards at each stage.

- The design criterion is used to compare the design of the programme.
- Programme operations are compared and judged against the input and process sections of the programme design.
- The extent to which provisional objectives are achieved is compared with the accomplishment of the terminal objectives which in turn is compared with their specification in the programme design.
- Costs of other programmes with similar goals are kept as criteria for comparing the cost of the existing programme.

The Discrepancy Model consists of five stages based upon a programme's natural development;

- Programme design
- Installation
- Process
- Product
- Cost benefit analysis

Each of these stages involves an assessment between reality, or performance, and standards.

1. The first stage is *design* which refers to the nature of the programme—its objectives, students, staff and other resources required for the programme, and the genuine actions planned to encourage attainment of the objectives that are preset. The programme design becomes the benchmark against which the programme is compared in the next stage.
2. In the second stage, *installation,* involves determining whether an implemented programme is harmonious with its execution plan.
3. The third stage *Process*, is the stage in which the person working as an evaluator serves in a formative role, he/she compares performance with laid down standards and focusing on the extent to which the interim or enabling objectives have been achieved.
4. The fourth stage, *product,* is related with comparing actual attainments against the standards (objectives) that were derived during Stage 1 and if discrepancies are occurring it has to be noted down.
5. The last final stage is concerned with the query of *cost.* A cost-benefit analysis is done of the completed programme and compared to other programmes that are similar in nature.

Because the chief function and point of reference of the Discrepancy Model is to make available the information for decision makers, Popham (1975) classifies it in his four-part model medley as a 'decision facilitation' model. But, as Popham acknowledges, there is overlap between the categories and the Discrepancy Model is vulnerable to the same criticisms levelled at the goal-attainment models.

In recent times, the discrepancy analysis proposed by Malcolm Provus in 1966 was used as the base for numerous approaches to programme evaluation. However,

Provus' untimely death with his books out of print, the evidence of his work has mainly lived on through the works and efforts of Daniel Stufflebeam and his associates at The Evaluation Center. DEM is referred to as an evaluation method, Scriven was of the opinion that the term 'evaluation has been incorrectly used in place of 'monitoring' which is a more apt term. Gredler (1996) suggests that this model will only prove to be successful under the following conditions:

- If the evaluation is formal and the programme is in the formative stage rather than the summative stage.
- If evaluation is an information management programme incorporated for improvement and assessment or evaluation is a part of programme expansion
- When evaluation is done to advance, uphold or conclude a programme
- When the evaluator functions as a facilitator, examiner of standards, observer of actual behaviours and design expert.
- When every stage of the evaluation programme performance is compared with the programme objectives to determine discrepancies.
- When the programme evaluation process identifies shortcomings

It can be concluded that Provus' DEM is an excellent and widely-accepted utilitarian model to use to evaluate educational programmes. Provus defined evaluation as 'the procedure in accordance to programme standards, determining whether a discrepancy exists between some aspect of the programme and standards governing that aspect of the programme, and using discrepancy information to identify weaknesses of the programme.' His stated that the purpose of evaluation is to 'determine whether to improve, maintain or terminate a programme.' His model is primarily a problem-solving set of procedures that seeks to identify weaknesses (according to selected standards) and to take remedial actions with cessation (end) as the option of last resort.

6.3.3 Humanistic Model of Stake's Responsive Evaluation Model

This model was pioneered by Stake (1973), and was further identified with Guba and Lincoln (1981). Responsive evaluation is not a much different model for conducting evaluation as a process for determining a model or models to use in evaluation. Evaluation in education is well thought of to be responsive if notice is paid to programme activities, stakeholder requirements for information is fulfilled, and if contradictory values and perspectives are recognized in reporting a programme's success or failure.

The humanist and constructivist theoretical frameworks identify the requirements and characteristics of the learner in combination with the creation of knowledge within a learning framework. These two theoretical frameworks helped in evaluating the usefulness of the portfolio component of QA programmes of health regulatory colleges in order to make sure that the needs of the individual learners are fulfilled. Still, given that the research is located in the context of QA programmes, it is significant to refer to a programme evaluation model. The idea of adding a programme evaluation model to the whole conceptual framework was to make certain that the viewpoints guiding the study included issues of programme design, development, and maintenance instead of just the needs and characteristics of the learners who are engaged in the compulsory unremitting learning activities. The model was brought into use to analyse the data and to evaluate the effectiveness of the portfolio component of QA programmes in some colleges.

This type of design is called as Emergent design. The concept of emergent design is to enter the evaluation technique or process without having biasness towards the various types of models to be used in conducting the evaluation. The type of models to use or best fit for the problem will 'come into sight' based on the types of information that the evaluation is generating. There is profound stress on stakeholder's contribution in this model. Programmes should be evaluated based on the needs of the stakeholders, not on whether the programme is meeting the objectives as it is in case of Goal-attainment model. Stake (1991) stated that the process begins by determining the issues or concerns of stakeholders. It is from these issues that are related to the stakeholders and data which is available relating to these issues, that the evaluation design begins to form.

Different models may be used for different issues and designs may vary as the evaluation process progresses. Stake and Hoke (1976) illustrated, 'We who take the responsive evaluation approach complete our studies without strong proof that the programme was a success or failure and even without hard data for making good comparisons, but we often end up with people understanding their programme better.' Stake was very confident in claiming in a speech that was delivered to the audience at the Gothenburg Institute of Educational Research, that responsive evaluation 'is an approach that sacrifices some precision in measurement, hopefully to increase the usefulness of findings to people in and around the programme.' Robert Stake's Responsive or Issues-centred programme evaluation model provides an important tool to swot up portfolios. Stake's responsive evaluation model was shaped as a result of his conviction that conventional evaluation models are too constricted in design and thus they lack to acknowledge the proposed and unintended difference between how curriculum works in practical sense and the external judgments and decisions made about the curriculum.

Guba and Lincoln (1981) suggested the following four phases to responsive evaluation:

1. Organizing the evaluation
2. Identify major issues and concerns
3. Conduction of research for gaining relevant information
4. Presentations of report results and recommendations

As clearly stated above, these steps leave reasonable bit of flexibility for a researcher to select the options from other evaluation models and research methods.

Pulley (1994) described a methodical five step approach:

1. Identify the decision makers
2. Identify the information needs of decision makers
3. Systematically collect both quantitative and qualitative data
4. Transform data into significant and meaningful information
5. Involve and inform decision makers on a continuous basis

Evaluation Standards

Robert Stake's Responsive Evaluation Model (REM) gets its source from a naturalist paradigm and places value on understanding both people and programmes in a particular context.

Responsive evaluation permits for the explanation of manifold perspectives that are often recognised as to be the 'Source of Conflict', concerns, or contextual complexities among the various stakeholders. The viewpoints are represented as *concerns* or *issues* and become the source for developing the *standards* whereby a programme can be evaluated. Stake (1975) has used the word *issues* to echo a sense of complication and urgency. As a result, the outcomes of the evaluation are more significant and therefore more likely to be acted upon. Also, it is central to make a note that this kind of evaluation is concerned with 'how a programme or curriculum operates.' Therefore it emphasizes the process rather than the outcomes. The use of issues orients an evaluation to make it more responsive to a variety of concerns and therefore can provide a more holistic account of a programme or curriculum. As responsive evaluation models permits for both qualitative and quantitative research methodologies therefore, responsive evaluation is often criticized for being too open and in real meaning, susceptible to the concerns and interests of the evaluator, who may in turn have complexity in prioritizing the issues raised by various stakeholders. Responsive programme evaluation models are supposed to give emphasis to insignificant issues instead of providing an evaluation of a programme in terms of a set of fundamental criteria. However, Stake strongly advocates that the lack of meticulousness, precision and measurement in responsive evaluation is a precious settlement made in order to increase the usefulness of the research findings.

The steps of responsive evaluation are described by Stake, are as follows:

- Documenting events
- Recording change
- Assisting in the decision-making process
- Seeking understanding
- Help in inferring remediation

The responsive evaluation model is compatible with the purpose and objectives of the study of the effectiveness of self-directed learning and self-assessment in portfolio models in various QA programmes, since a responsive evaluation tool can include how QA programmes were established and whether these programmes balance the needs of the individual learner while ensuring continued competence. Moreover, a responsive approach to evaluation in this context will help to assess if programme change and remediation are required for QA programmes in order to maximize their full potential.

The data matrix as figured by Stake in the year 1967 provides a framework for an evaluator to congregate and analyse the compulsory data for assessment of an educational programme, including statements of the various stakeholders. Here care should be taken to define the difference between description and judgment and the roles they accomplish in Stake's data matrix for educational programme evaluation. Description within this evaluation framework includes instruction and accomplishment and the relationship between the two. Judgment as described in the evaluation framework of Stake, suggests that the evaluator processes the judgments made by others rather than portraying a personal judgment. As a result, the evaluator gathers subjective opinions in an objective manner

The evaluation model proposed by Stake (1967) consists of the description and judgment matrices. Within the description matrix, there are both intents and observations. By the intents of the educational programme Stake means the conditions, demonstrations, and behaviours that are taken into consideration when a programme is designed. The intents may also take account of elements of the hopes, anticipations, and even uncertainties

related to the implementation of an educational programme. In contrast, observations are the description of the surrounding environment and events as experienced by the evaluator. The judgment matrix includes both standards and judgments, which also play an important role in putting up with educational evaluation to reach at conclusions in Stake's process of evaluation. The primary goal of education is brilliance and merit, which requires clear standards. The standards of an educational programme show a discrepancy between stakeholders, and it is the accountability of the evaluator to point out which standards are attributable to which group. Therefore, before making a judgment, the evaluator makes sure whether the standards that are set have been met and consequently assign magnitude to each set of standards. The final component of the data matrix is the rationale of the educational programme, which is considered to be the philosophic backdrop or purposes of the programme i.e. Stake's Responsive Model Program.

According to Stake (1967), evaluation of an educational programme requires that the antecedents, transactions, and outcomes of a programme have to be taken into account. The antecedent is defined as those condition that are present before the commencement of the learning, while the transactions are measured to be the sequence of actions and engagements that make up the process of education. Thus according to Stake, final outcomes of the evaluation programme are the achievements, skills, and abilities that are produced from an educational experience. The evaluator must glance at the relationship between these three indicators. Apart from the above objectives to be achieved the evaluator also makes an assessment of the situation of what was the planning done and what in reality has been occurring in an educational programme, thereby establishing possibility and congruence between the intents of the programme and the evaluator's observations.

The functional organization of Robert Stake's responsive evaluation model can be identified as 12 recurring events that may possibly happen simultaneously and with a number of repetitions till the evaluation is completed. The specific events included in the responsive evaluation model include:

- Discussion with clients
- Identifying scope of programme
- Discovering concerns
- Harmonizing issues with the different concerned parties
- Formatting the evaluation making it ready for use by the intended audience

A significant portion of time in responsive evaluation is for observing the programme, after which discussion is held with various stakeholders involved in the programme. It is because of the discussion done with all the interested parties that permits the evaluator to substantiate the scope of the programme, activities, and purposes along with making comparisons amongst the various stakeholders. This helps the evaluator to establish the context of the evaluation. Stake has placed 12 events to illustrate the various processes involved in a responsive evaluation. He observed that the connection between events is not necessarily clockwise and predictable but rather a liquid movement between all events that creates a holistic evaluation model for educational programmes.

Evaluation of Stakes's Model

It was expected that Stake's responsive evaluation model would be a good match to a study of the selected QA programmes as it gave us a strong framework for examination

of documents and for analysing data from discussions with administrators. However, on conduction of only some of the events that were proposed by Stake gave a limited scope to the study of the effectiveness of the model. Responsive programme evaluation is criticized for its weakness to the concerns of the evaluator, and therefore the evaluation may focus only on insignificant issues instead of purposeful criteria.

Regardless of the critiques, responsive programme evaluation has been useful in medical education studies to uncover meaningful information for decision-making processes.

Curran et al. (2003) reported that responsive evaluation model was used in evaluating the Clinical Skills and Assessment and Training (CSAT) programme at the Faculty of Medicine at Memorial University of Newfoundland. The study included the interview of 12 graduates relating to their experiences with the CSAT programme, and an external evaluator conducted a meta evaluation of the responsive evaluation process. A customized version of Robert Stake's 12-step responsive evaluation model was applied to the CSAT programme and the results demonstrated that the evaluation gathered rich and descriptive information about the educational processes. Stake further contend that the study was fruitful in establishing the importance of responsive evaluation to the medical community because it advocates focus on the stakeholders' need for information, uncovers conflicting concerns related to the achievement of medical educational programmes, and at length, defines the underlying processes of medical education leading to programme success.

6.3.4 Parlett and Hamilton Evaluation Model

The Illuminative Evaluation Model of Parlett and Hamilton (1977), was chosen for testing purpose because it corresponded with the philosophy and value system of the investigator. This model had the following features as an advantage:

1. Allowed the study of varying and emerging problems
2. Encouraged manifold viewpoints and perspectives
3. Focused mainly on performances and issues than on the programme's outcomes
4. Provided means for studying spontaneous actions and situations

In Illuminative Evaluation Model, the wider contexts in which education programmes function are taken into account. Its main concern is with explanation and interpretation rather than measurement and prediction. It stands explicitly within the substitute methodological paradigm. The aims of illuminative evaluation are to study the innovatory programme; how is school situations in which it is applied; what are the advantages and disadvantages for those who are directly concerned with it; and how does it affect the intellectual tasks and academic experiences of the students. In short, it seeks to deal with and to illuminate a complex array of questions

Illuminative evaluations is said to have three principal stages characteristically:

- Observation
- Inquiry
- Explanation

The first stage is an exploratory stage during which the investigator becomes well-informed about the programme and people involved in it and tries to comprehend

and text the day-to-day reality of the setting or settings under study. No attempt is made to manipulate, control or eradicate situations of programme developments. Persons involved in the programme like faculty, participants, planners and any other related to it are observed and interviewed. Documents are reviewed to obtain an historical perspective as well as a perspective on how people look upon the innovation.

The second stage is a narrowing focusing process. It is an interactive process between evaluators and relevant decision-makers or information users. Narrowing and focusing the study means dealing with several basic concerns. What is the purpose of the evaluation? How will the information be used? What will be known after the evaluation that we do not know now? What can we do after the evaluation that we cannot do now for lack of information? What topics or concerns should be selected for intensive investigation?

Narrowing and focusing are key elements because programmes are so complex and have so many levels, goals, and functions. There are always more potential study topics than there are time and resources to examine. The alternatives, therefore, have to be narrowed, clarified and redefined.

When the alternatives have been clarified and defined, the evaluator must determine evaluation procedures. Illuminative evaluation does not have simple, standardized procedures for those functions, so the evaluator might incorporate other models that offer guidelines for operationalizing the model. For example, if the study focuses on participant reactions, the extent to which the programme content was assimilated and/or the change in job behaviour, the evaluator might incorporate Kirkpatrick's'(1967) or Hamblin's (1974) model. Both these models offer guidelines for operational zing the evaluation.

The third stage consists of quest of general principles underlying the organization of the programme, spotting patterns of cause and effects, and explaining individual findings within broader explanatory context.

Within the three stage framework of illuminative evaluation, the investigation can combine four different data gathering techniques permitting the programme to be examined from a number of angles. These are:

- Observation of the participants and events
- Interview with participants, resource persons, and administrators
- Questionnaires covering many aspects of the program
- Historical research with existing documents.

The following paragraphs describe the data gathering techniques in more detail.

- Observations are an essential part of illuminative evaluation. They are intended primarily to build-up a continuous record of on-going events to add interpretive comments on obvious and latent features of the programme, and to uncover tacit assumptions and interpersonal relationships.
- Interviews are used primarily to determine the perceptions and view of individual participants. Discovering the view of participants is crucial to assessing the impact of the programme. Informal interviews often provide unique insights into programme processes experienced by different people.

Illuminative Evaluation Stages

Stage One – Observation

The investigator becomes knowledgeable about the program and people involved.

Activities

- Review or discover what is expected at the outset
- Consider the questions, hypotheses or issues already raised
- Look for possible studies to use as models
- Review historical documents
- Form initial plan of action
- Anticipate key problems and events
- Consider possible audiences for preliminary and final reports

Stage Two - Inquiry

The investigator narrows and focuses the study.

Activities

- Arrange access to programme negotiate plan of action
- Discuss arrangement to maintain confidentiality of data, source and reports
- Select and develop questionnaires or standardized procedures if any
- Work out record-keeping system
- Make observations, conduct interviews, use questionnaire
- Keep records of activities and changes

Stage Three - Explanation

This is the analytic and interpretation phase.

Activities

- Classify raw data and begin interpretations
- Gather additional data, triangulate data to validate key observations
- Search for patterns of data
- Seek linkages between programme arrangements, activities and outcomes
- Select illustrations
- Draw tentative issues, organize according to issues
- Describe the setting where the activity occurred
- Draft reports
- Describe methods of investigation
- Revise and disseminate reports

Questionnaires and tests are included to obtain information that sustains or qualifies earlier tentative findings.

Historical research using documentary and background sources provides information about the development of events. The gathering of background information yields a historical perspective of the way the programme was regarded by different people before the evaluation began. This information can be obtained from letters, minutes of meetings, and reports. The data gathered often suggest topics that need investigation and expose aspects of the programme that otherwise would be missed.

The three stages of illuminative evaluation do not function separately; they overlap and are interrelated. The transition from stage to stage occurs as problem areas become progressively clarified and redefined. Beginning with an extensive data base, using the data gathering techniques mentioned above, the investigator systematically reduces the scope of the inquiry to give more concentrated attention to the merging issues. This 'progressing focusing' permits unique and unpredicted phenomena to be given due weight. It reduces the problem of data overload and prevents the massive accumulation of unanalysed material (Parelett & Hamilton, 1976)'.

6.3.5 Context, Input, Process, Product Model (CIPP Model)

The CIPP Model was introduced by Daniel Stufflebeam (1971). Stufflebeam's model when applied in an educational setting determined whether a particular effort resulted in a positive change in school, college, university or at a training organization. His model is based on decision-making regarding the programme that is to be introduced. For an evaluation to be performed correctly so it can assist in the decision-making process, the curriculum evaluators have to:

- Delineate what needs to be evaluated and determine the information required for evaluation.
- With the help of selected techniques and methods, assemble the required information.
- Make the information available to concerned parties.

With the help of the four types of evaluation, i.e., context, input, process and product, a decision is made whether to maintain, modify or eliminate the new curriculum or programme.

This model of evaluation that has been proposed by Stufflebeam puts into use of both formative and summative evaluation to check the overall effectiveness of a curriculum programme.

6.3.6 Eisner's Connoisseurship Model

With a background in aesthetics and art education, Elliot Eisner (1979) developed the connoisseurship model. In the connoisseurship model, the approach of evaluation deals with qualitative appreciation. Eisner's model is based on two closely-related constructs—connoisseurship and criticism. According to Eisner, connoisseurship is the art of appreciation where recognition and appreciation takes place through perceptual memory that draws from experience to appreciate what is significant. It is the ability both to perceive the particulars of educational life and to understand how those particulars form a part of a classroom structure. Eisner states that criticism is the art of disclosing qualities of an entity that connoisseurship perceives. In this type of disclosure, the educational

critic is more likely to use what Eisner refers to as 'non-discursive,' a language that is metaphorical, connotative, and symbolic. It uses linguistic forms to present rather than represent conception or feeling.

Eisner suggests that educational criticism has three aspects, which are as follows:

(i) Descriptive aspect that is an attempt to characterize and portray the relevant qualities of educational life—the rules, the regularities, the underlying architecture.

(ii) Interpretive aspect uses ideas from social science to explore meanings and develop alternative explanations to explicate social phenomena.

(iii) Evaluative aspect makes judgments to enhance educational processes and provides grounds for the value choices made so that others might better disagree.

6.3.7 Scriven's Goal-free Model

Michael Scriven was the first scholar to question the role of goals and objectives in the evaluation process. Scriven had the opportunity to be a part of several evaluation projects where he observed that the so-called side effects were more significant that the original objectives. This led Scriven to question the difference between intended and unintended effects and the goal-free model was the outcome of this satisfaction.

When conducting a goal-free evaluation, the evaluator functions as an unbiased observer who starts be generating a profile of needs for the group served by a given programme (Scriven has not clearly stated the process of how this needs profile is to be derived). The actual effects of the programme are then evaluated by the evaluator using methods that are primarily qualitative in nature. If the programme is responsive to one of the identified needs, then the programme is deemed to be useful.

Scriven's main contribution was to redirect the attention of evaluators and administrators to the importance of unintended effects—a redirection which is especially useful in education. Scriven also suggests that goal-free evaluation needs to complement and not supplant goal-based assessment. If used alone, it does not provide sufficient information to the decision-maker.

6.3.8 Tyler's Objectives-centered Model

Ralph Tyler proposed the objectives-centred model which continues to influence many assessment projects. In his book, Principles of Curriculum and Instruction, Tyler explains his model which takes place in several rationally and systematically related steps:

(i) This starts with previously determined behavioural objectives which specify the content of learning and the expected student behaviour.

(ii) Identify scenarios where the student is provided with an opportunity to express behaviour embodied in the objective and that evokes or encourages such behaviour.

(iii) Select, modify or construct suitable evaluation instruments and also check these instruments for objectivity, reliability and validity.

(iv) Use of instruments to achieve summarized or appraised results.

(v) Make a comparative analysis of the obtained results received from several instruments before and after in a certain period of time. This will help to measure the change that is taking place

(vi) Analyse results to assess the strength and weaknesses of the curriculum.

(vii) With the help of the results make necessary changes in the modifications.

CHECK YOUR PROGRESS

4. What are the different methods of evaluation?
5. State the basic concept of evaluation paradigm of Metfessel and Michael.
6. How has Provus defined evaluation?

6.4 SUMMARY

- In any process of curriculum development, contemporary thinking in education plays a very significant role.
- To exchange a few words with students about what a topic is intended to do is fine educational practice.
- Aims may serve as organizing doctrines of educational course for more than one grade.
- Goals may encompass the whole programme, subject area, or manifold-grade levels. They may be in both nebulous language or in more particular behavioural terms.
- Content selection requires offering suitable balance to subject knowledge, process skills and the growth of the student as learner as well as to specify and context.
- Ralph W. Tyler (1902–1994) was an US educationalist who worked in the sphere of assessment and evaluation. He was the advisor to a number of bodies that established guidelines for the expenditure of federal funds and influenced the fundamental policy of the Elementary and Secondary Education Act of 1965.
- In 1967, Wheeler came up with a cyclic model of curriculum process going through the following five phases:
  - o Aims, goals and objectives
  - o Selection of learning experiences and Selection of content
  - o Organization of integration of learning
  - o Experiences and content
  - o Evaluation
- According to Hilda Taba, the development of new curricula and programmes is more effective if it is based on the principles of democratic guidance and on the well-founded distribution of work.
- System Analysis is closely related to training psychology and cybernetic.

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- The term, 'system analysis' has emerged from the scientific management concept. It involves utilization of scientific mathematical techniques in organizational operation as a part of decision-making activities of the management.
- After the system analysis, the investigator attempts to design a tentative solution to the problem.
- A formal evaluation of the new solution is done for checking its workability.
- The purpose of system analysis is to get the 'Best environment in the best place for the best people, at the best time and in the best price.'
- According to Worthen and Sanders (1987) evaluation can be considered as a formal or well-organized approach to scrutinize the value of a programme based not only on its outcomes but also on its context, inputs, processes and procedures, and products.
- Evaluation can be done as formative, summative, or a combination of the two.
- Tyler considered evaluation research to be a way of deciding whether the programme that has been implemented is meeting a set of predetermined criteria or not.
- Discrepancy Evaluation Theory was developed in year 1966 by Malcolm Provus and is regarded as a *Systematic Approach for the Evaluation of Career Planning and Placement Programmes*. The Discrepancy Evaluation Model gives information for programme assessment and programme enhancement.
- Provus Discrepancy Evaluation Model designed by Malcolm Provus in 1969, is a well experienced and generally accepted utilitarian model to use in evaluating educational programmes.
- Humanistic model was pioneered by Stake (1973), and was further identified with Guba and Lincoln (1981).
- The humanist and constructivist theoretical frameworks identify the requirements and characteristics of the learner in combination with the creation of knowledge within a learning framework.
- The model was brought into use to analyse the data and to evaluate the effectiveness of the portfolio component of QA programmes in some colleges.
- The Illuminative Evaluation Model of Parlett and Hamilton (1977), was chosen for testing purpose because it corresponded with the philosophy and value system of the investigator.
- In Illuminative Evaluation Model, the wider contexts in which education programmes function are taken into account. Its main concern is with explanation and interpretation rather than measurement and prediction. It stands explicitly within the substitute methodological paradigm.

6.5 KEY TERMS

- **Aim statement**: It is a beginning point; a declaration of educational intention and direction for the subject.

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- **Topic description:** It is more often than not the first information about a topic that potential students encounter.
- **Learning outcomes:** These are the statements of the capabilities that a student should be able to display on triumphant completion of the topic.
- **Curriculum model:** It refers to a plan of action that can be employed to structure a subject or knowledge area from a theory into practice.

6.6 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Tyler formalized his thoughts on viewing, analyzing and interpreting the curriculum and instructional programme of an educational organization in his book named *Basic Principles of Curriculum and Instruction* (1949).
2. The subject matter should be organized on the basis of the following factors:
   - Discuss subjects or courses
   - Broad fields or disciplines
   - Core or interdisciplinary
   - Skills and processes
   - Projects and activities
3. According to Hilda Taba, in the process of curriculum development, the expected changes in the individual or social consciousness will take place only if individuals or groups, under pressure to introduce these changes, conserve or acquire the ability to learn.
4. Evaluation can be done as formative, summative, or a combination of the two.
5. The concept of Evaluation Paradigm of metfessel and Michael is to engage stakeholders as facilitators, formulates specific goals and objectives, translates the formulated objective into transmissible form, select/constructs instruments to aid determine programme efficiency, carries out intermittent observations, analyses data, interprets data, and develops recommendations.
6. Evaluation has been defined by Provus as the process of:
   - Defining the standards of the programme
   - Making it clear whether a discrepancy does exist between some aspect of programme performance and the standards governing that aspect of the programme
   - If discrepancy exists then this information is used either to bring change in performance or to change programme standards

6.7 QUESTIONS AND EXERCISES

Short-Answer Questions

1. Define the term 'curriculum design'.
2. How is the 'topic description' developed?
3. Differentiate between 'goals' and 'objectives' in the context of curriculum development.

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4. What is meant by the organization of learning experiences?
5. According to Tyler, which were the fundamental questions in developing curriculum?
6. What are the advantages of objective-oriented evaluation approach.

Long-Answer Questions

1. Discuss the processes of selection of content and selection of learning experiences.
2. Describe R. Tyler's model of curriculum development.
3. Evaluate D. K. Wheeler's model of curriculum development.
4. Review the model of curriculum development proposed by Hilda Taba.
5. Write a short note on the Discrepancy Model of Provus.
6. Discuss models of curriculum development of Stake and Parlett and Hamilton.

6.8 FURTHER READING

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UNIT 7 CURRICULUM ISSUES

Structure

7.0 Introduction
7.1 Unit Objectives
7.2 Curriculum at National, State and Local Levels
  7.2.1 National Level
  7.2.2 State Council of Educational Research and Training (SCERT)
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7.10 Further Reading

7.0 INTRODUCTION

Education in India is provided by the public sector as well as the private sector, with control and funding coming from central, state, and local governments. Takshasila was the earliest recorded centre of higher learning in India. The Nalanda University was the oldest university-system of education in the world in the modern sense of university. Western education became ingrained into Indian society with the establishment of the British Raj.

Education in India falls under the control of both the Union Government and the State Governments, with some responsibilities lying with the Union and the states having autonomy for others. The various articles of the Indian Constitution provide for education as a fundamental right. Most universities in India are controlled by the Union or the State Government.

The role of the Government of India was limited to coordination and deciding on the standards of higher education. This was changed with a constitutional amendment in 1976 so that education now comes in the *concurrent list*. That is, school education policies and programmes are suggested at the national level by the Government of India though the state governments have a lot of freedom in implementing programmes. Policies are announced at the national level periodically. The Central Advisory Board of Education (CABE), set up in 1935, continues to play a lead role in the evolution and monitoring of educational policies and programmes.

In this unit we will study the role of the government in education at the national, state and local level.

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7.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Discuss the curriculum at national, state and local level
- Explain the preparation and evaluation of a textbook
- Describe core-curriculum

7.2 CURRICULUM AT NATIONAL, STATE AND LOCAL LEVELS

India has made progress in terms of increasing the primary education and expanding literacy to approximately three quarters of the population. India's improved education system is often cited as one of the main contributors to the economic rise of India. Much of the progress, especially in higher education and scientific research, has been credited to various public institutions.

Curriculum means:

- That which is taught in schools
- A set of subjects
- A course of study
- Content
- A program of studies
- A set of materials
- A sequence of courses
- A set of performance objectives

On this basis, curriculum can be defined as a wide-ranging plan for an educational/training programme/course to offer new/improved manpower to fulfil the rising needs of a vibrant society.

There is a national organization that plays a key role in developing policies and programmes, called the National Council for Educational Research and Training (NCERT) that prepares a National Curriculum Framework. Each state has its counterpart called the State Council for Educational Research and Training (SCERT). These are the bodies that essentially propose educational strategies, curricula, pedagogical schemes and evaluation methodologies to the states' departments of education. The SCERTs generally follow guidelines established by the NCERT. But the states have considerable freedom in implementing the education system.

7.2.1 National Level

Much development took place between 1964 and 1985 in the field of education in India. One education commission was there in this period i.e. *National Education Commission also known as Kothari Commission (1964-66)* which was appointed by the government of India to make all-inclusive review of the educational system in order

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to renovate or modify the existing education. The outcome of this commission was a National Policy on Education in the year 1968. To look into the different aspects of education three five year plans were also executed during this period. Finally when the National Policy on Education, 1968 was evolved, many of its major recommendations were either rejected or diluted in terms of vague and non-specific suggestions with a view to avoid all the controversies that erupted due to the commission's recommendations. The education system failed to fulfil the needs and demands of the various social groups and empirical evidences show that this formal education system suffered from a myriad of limitations. India underwent many changes in the last phase of nineteen century due to unstable government, economic crisis and other causes. It was felt necessary to review the role of education and developments that took place in the past. The result was a status document called *Challenge of Education: A Policy Perspective* prepared by the Indian government after a deep and careful analysis.

Rajiv Gandhi, the then Prime Minister of India, on the basis of Kothari Commission forwarded the National Educational Policy. The nation discussed and reflected upon this issue as to what should be the draft of the new Educational Policy that can develop citizens for 21st century who can stand along with the world. The policies should be such that can fulfil the needs of the nation. Keeping this in mind the National Policy was drafted in the year 1986 and suggestion were given for different aspects and levels of education that could be put into practice without further delay. Due to the change of government at the centre there was an indifferent attitude towards the Educational Policy and a review committee was formed. This committee evaluated the practical aspects of this educational policy to judge its effectiveness and usefulness. The attitude of this committee was positive towards this educational policy.

Special features of the National policy of Education which formed the basis for the Curriculum for the nation are as follows:

- The NPE 1986 contended that the role of education is essentially to transform a static society into a vibrant one with commitment and development and change. The policy recognised the need for creating not only access to education for all sections but also getting them involved in the process of continuing education so as to promote a learning society.
- Further, the Policy also laid special emphasis on the role of education in adequately equipping the new generation stepping into 21st century with required skills and competencies.
- Following the 42nd amendment of the Indian Constitution with the authority to legislate on education concurrently with the States so far as organization and structure of education is concerned, the NPE operationally defined concurrence as a meaningful partnership between the Centre and States and placed clear responsibility on the Union Government regarding the national and integrative character of education, quality and standards, manpower planning research and advanced study, culture, human resources development and the international aspects of education.
- The NPE 1986 gave an unqualified priority for Universalization of Elementary Education and indicated a vital shift from mere provision of schooling facilities for the improvement of facilities, universal enrollment and participation and achievement of satisfactory levels of learning. The Policy advocated due track approach with simultaneous attention on adult literacy

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and primary education. While shifting its focus from enrollment *per se* to enrollment as well as retention and achievement, it also laid conditionality for success.

- There are some common points between the NPE 1968 and NPE 1986. They refer to the recurrence of the commitment towards a Common School System and the common educational structure of 10+2+3. The NPE 1986 has gone a step further while reemphasizing the place of common core curriculum in the National System of Education by specifying the underlying values. They are India's common cultural heritage, egalitarianism, democracy and secularism, equality of sexes, protection of the environment, and removal of social barriers, small family norm and inculcation of the scientific temper.
- Another important milestone of the NPE 1986 is its commitment to laying down minimum levels of learning at each stage of education aimed to ensuring the quality of education and comparability across the nation.
- The NPE 1986 declares that the entry into the higher education and technical education would be based on the requisite merit regardless of the origin of the aspirant.
- Another important indication for the promotion of opportunity and creating learning society is found in the thrust given to open and distance learning in the policy.

The Policy proposed a three-pronged strategy to realize the task of universalization of primary education:

- Firstly, to provide a motivating school environment through child-centred and activity-based learning process at the primary stage. In this context, the policy emphasized the need for providing supplementary remedial instruction to first generation learners and allowing them to progress.
- Secondly, to improve the inputs for teaching-learning process by providing essential facilities in primary schools in terms of classrooms, teachers, and other teaching-learning equipments. The above facilities are to be delivered to all the primary schools in a phased manner under the scheme called Operation Black Board (OBB Scheme).
- Thirdly alternative stream of systematic non-formal programme is to be designed to ensure the coverage of children who dropout from the habitation without schools, working children and girls who cannot attend regular schools to ensure universalization. In order to ensure the quality of such non-formal education, efforts will be made to use modern technological aids and the services of talented local young men and women from local community with training.

With respect to the quality, the Policy proposed to formulate curriculum for inculcating values of healthy, work ethos, humane and composite culture.

Establishment of Navodaya Schools

For the first time in independent India a nationwide programme of special schools under the name of pace setting schools has been proposed. Such schools are meant for talented children largely rural, selected with due care bestowed for equity and social justice consideration. These institutions are residential in nature and education is provided free of charge. Such schools have already come into existence as Navodaya Schools under the subsequent Five Year plans all over the country.

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Apart from the special courses at the +2 stage, the Policy envisages appropriate flexible non-formal vocational courses for the youth who leave the formal school at the primary stage, school dropouts and neo-literates with special preference to the needs of women. Provision of tertiary level vocational courses is made for those who complete their higher secondary education through academic stream and who require such courses.

National Open School (NOS)

The National Open School was started in India by the Central Board of School Education in 1979. The objective of establishing this School was to provide alternative opportunity through distance education mode to a heterogeneous clientele comprising the rural people, urban poor, women, SC/STs, working adults and school dropouts who are unable to attend the formal school system. The unique features of these NOS are that it takes education to the doorsteps of motivated learners and does not impose limitations of time and place. Further, it makes provision for studying at one's pace and convenience. Various types of support services are provided to the clientele including Personal Contact Programmes through a number of Accredited Institutions which are located across the length and breadth of the country. The Government of India had conferred autonomous status to NOS with administrative control vested with the Department of Education, MHRD in 1989 which was subsequently amalgamated with it in 1990. The NOS has the authority to conduct its own Secondary/Senior Secondary examinations and issue certificates.

The commencement of the Seventh Plan coincided with a comprehensive review of the policy. Accordingly, the plan provided for reorientation of the education system so as to prepare the country to meet the challenges of the next century. The main thrust areas in the Seventh Plan were:

- Achievement of universal elementary education
- Eradication of illiteracy in the age group of 1-35 years
- Vocational and skill training programmes at different levels of education
- Up gradation of standards and modernization at all stages of education with effective links with the world of work and with special emphasis on science and environment and on value orientation
- Provision of facilities for education of high quality and excellence in every district of the country
- Removal of obsolescence and modernization of technical education

The Plan also delineated effective decentralised planning and organization reforms, promotion of non-formal and open learning systems, adoption of low cost alternatives and optimum use of resources as strategies for achievement of the plan objectives.

The plan priorities for *elementary education* were:

- Paramount priority was to universalise elementary education, with a shift in emphasis from mere enrolment to retention of pupils in schools i.e. to prevent wastage and stagnation. Another aim was achievement of basic elements of learning by them.
- Formal and non-formal methods to effectively cover girls and children of weaker sections.

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- Provision of in-service training for teachers and developing and strengthening teacher training institutions.
- Promotion of girl's education through the appointment of women teachers, attachment of pre-school centres, provision of free uniforms and other incentives.
- Specific funds to enhance the quality and efficiency of elementary education through school building and curricular materials.
- Also, the open school systems and distance learning techniques to meet the additional demand for secondary education arising out of expansion in primary education; expansion of facilities were linked with serving the needs of girls and other backward children.
- Free education for girls up to higher secondary stages.

At the *secondary stage* the priorities were as follows:

- Strengthening and universalising science education through upgrading the curricula, laboratory facilities and large scale in-service training programmes for teachers.
- Strengthening vocationalisation of education programmes of Socially Useful Productive work (SUPW).
- Vocationalisation for higher education through diversification to cover a large number of fields in agriculture, industry, trade, commerce and services. The introduction of the vocational courses was linked with emerging work opportunities, in a lithe manner.
- Extending computer literacy programme initiated during Sixth Plan and augmenting audio and video programmes at secondary stage
- In-service training of teachers for developing software and effective use of modern communication technologies and computers in education was to be promoted.
- Revision of textbooks and strengthening libraries for imparting value oriented education with a national perspective.

It should be noted that the strategy of the Seventh Plan underwent a change in the middle of the Plan period following the adoption of the National Policy on Education in 1986. As a result of this the following new thrust in education was taken up (i) universal enrolment and universal retention and (ii) substantial improvement in the quality of education. OB was launched as a part of implementation of the National Education Policy, 1986. The scheme of non-formal education was revised and a number of schemes for teacher education were also taken up.

Education in India

In India education is provided by the public sector as well as the private sector, and the control and funding comes from three levels:

- Central
- State
- Local

Education in India comes under the control of both the Union Government and the State Governments, with some responsibilities lying with the Union and the states having autonomy for others. The education is provided as a fundamental right by the various articles of the Indian Constitution. Most universities in India are controlled by the Union or the State Government.

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India's education system in general is divided into different levels:

- Pre-primary level
- Primary level
- Elementary education
- Secondary education
- Undergraduate level
- Postgraduate level

The National Council of Educational Research and Training (NCERT) is the top most body that decides the formulation and implication of the curriculum related matters for school education in India. The National Council of Education Research and Training (NCERT) formulated the first Curriculum Framework in 1975 as a recommendation to the individual states. NCERT was accorded the responsibility of developing a binding National Curriculum Framework through the National Policy on Education (NPE) (1986). NCERT reviews the curriculum every five years on the basis of consultations within the whole school sector. The core areas of the curriculum are common. Teaching of English is usually compulsory in classes VI-X in most of the states/UTs. NCERT published a New National Curriculum framework in 2005.

The New National Curriculum to be introduced in textbooks in three phases:

- Phase one, 2006-07: classes I, III, VI, IX and XI.
- Phase two, 2007-08: classes II, IV, VII, X and XII
- Phase three, 2008-09: classes V and VIII

NCERT has gradually been changing the curriculum from traditional information provision to be more learner-oriented and competence-based.

A number of schools in India are provided support and technical assistance by the NCERT and it oversees many aspects of enforcement of education policies.

The range of curriculum bodies leading and controlling school education system in India is:

- Main is the state government boards, in which the majority of Indian children get enrolled.
- The Central Board of Secondary Education (CBSE). This board conducts two examinations, specifically, the All India Secondary School Examination, AISSE (Class/Grade 10) and the All India Senior School Certificate Examination, AISSCE (Class/Grade 12).
- The Council for the Indian School Certificate Examinations (CISCE). CISCE conducts three examinations, namely, the Indian Certificate of Secondary Education (ICSE - Class/ Grade 10); The Indian School Certificate (ISC - Class/ Grade 12) and the Certificate in Vocational Education (CVE - Class/ Grade 12).
- The National Institute of Open Schooling (NIOS) conducts two examinations, namely, Secondary Examination and Senior Secondary Examination (All India) and it also conducts some courses in Vocational Education.
- International schools affiliated to the International Baccalaureate Programme and/or the Cambridge International Examinations.
- Islamic Madrasah schools, the boards of madrasahs are controlled by the local state governments, or they can be autonomous, or affiliated with Darul Uloom Deoband.

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- There are many autonomous schools functioning in India like Woodstock School, The Sri Aurobindo International Centre of Education Puducherry, Auroville, Patha Bhavan and Ananda Marga Gurukula.

In addition to the above NUEPA (National University of Educational Planning and Administration) and NCTE (National Council for Teacher Education) are also accountable for the execution of the education system and teacher accreditation.

National standards give state and local committees a direction and focus as they take the responsibility of critically important task of curriculum design. Key concepts and principles, critical content knowledge, and major processes and skills necessary for the various disciplines are acknowledged from the national documents. The national standard documents, in most of the situation, provide a wealth of background knowledge and information to support educators in the field as they educate indispensable knowledge and skills. To reconceptualise both curriculum and instruction in reply to our speedily changing society, there is need for the teachers to develop in-depth conceptual and content knowledge across the disciplines. The national standards are a helpful and valuable resource for teachers as they practise a deeper understanding of their disciplines.

1. Curriculum of Primary Education in Modern India

The 10+2+3 pattern of education was declared in the National Education Policy, 1968 and the National Council of Educational Research and Training (NCERT) prepared a Core Curriculum for the first 10 years of education in 1975. In the meantime some provinces prepared their curriculum for first ten years of education on the basis of this core curriculum. The National Education Policy, 1986 emphasized the implementation of the 10+2+3 pattern of education compulsorily in the whole country. The National Council of Education Research and Training (NCERT) published a new framework of core curriculum for the first ten years of education in 1988. This Core Curriculum was yet to be implemented by the time in November 2000, NCERT presented another new framework of core curriculum for the first ten years of education. In the National Policy on Education, 1986 it was declared that the curriculum for any level of education would be revised after every five years. In accordance with NCERT presented a new framework of school curriculum in 2005 in which the curriculum for the first eight years of education is as follows-

A. Class I to V

- Mother-tongue (regional language)
- English
- Mathematics
- Environmental Studies
- Art and Craft
- Health and Physical Education
- Work Education

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B. Class VI to VIII

- Mother-tongue (regional language)
- Modern Indian language
- English
- Science and Technology
- Mathematics
- Social Sciences (History, Geography, Civics, Economics)
- Art Education
- Health and Physical Education

The speciality of this curriculum framework is that besides what to teach, it has also been made clear in it, that why to teach, how to teach and what should be the result of teaching it. Though this curriculum has not been followed in most of the provinces in its true form yet the study of English has been made compulsory from class five in twenty-five provinces.

Advantages of the Primary Education Curriculum

Primary Education is the Foundation Stone of education: The medium of communication, language is taught to the children in primary education. They are trained in general human behaviour and reading skills and their power of visualization and comprehension is developed. These are the means to acquire education. Thus primary education acts as the foundation stone for secondary and higher education. If this foundation stone is laid properly, the secondary and higher education run smoothly.

Primary Education is the Basis of Personality Development: The psychologists have arrived at the conclusion that personality of a person is shaped mostly in childhood, three fourth of it is shaped at this stage. The future of a child depends on the type of foundation laid at this stage. The children step in primary schools carrying over the culture and traditions of their family. However, children are not so resistant that they cannot be moulded into a new environment. It is in the primary schools that the social, cultural, moral and character development of the children take place. They are trained in human behaviour and in this way their personality is shaped.

Primary Education is Mass Education: At present, primary is free and compulsory in every country. The word compulsory in this context means a minimum of this much (primary education) should be acquired by everyone. The education which is compulsory for everyone is generally termed as mass education. That is why, it is later on provided in the form of adult education to those adults who fail to acquire it in their childhood. If this decree of compulsion is followed strictly, a will definitely change the form of adult education, it will take the form of continuing education in place of literacy mission

Primary Education is the Education of Common Life: When it is said that primary education is mass education, it is an education for all then it means that in primary education everyone is educated to live a general life. Higher education prepares us for the different fields of life. From this point of view also, primary education is important for any society.

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Primary education is a complete education for 40 per cent people in India. In our country, primary education from class I to VIII is free and compulsory, it is observed that for about 40 per cent of the children this primary education is complete education from this point of view primary education becomes all the more important in India.

Problems or Shortcomings of primary education in India and their remedies

In 1947 the condition of primary education in our country was very pathetic and many problems existed in this field. Continuous efforts are being made to solve those problems and have succeeded to overcoming some of those problems.

1. Core curriculum for primary education has been developed, but still it has not been implemented in its full sense all over as yet.
2. The aims of primary education are being fixed and made clear in the curriculum but with the emergent need of the time some changes are bound to occur, therefore curriculum should be updated regularly.
3. With the change of time many good methods of teaching have been developed and teachers are being trained in them, but the irony is that the teachers use them rarely.
4. It has now been decided that primary education will be imparted through regional languages. Of course, scheduled tribe children whose mother-tongue and the regional languages are different, in the first two years they will be educated through their mother-tongue and in the third year onwards through the regional languages. At the same time the English medium primary schools will keep functioning. In this way, there is now no problem about the medium of education at the primary level .But it should have its practical implementation.
5. In the meantime, a large number of male and female teachers have been trained for primary schools. At present, these is no shortage of trained male and female teachers in the country, the only delay is in their appointment.

2. Curriculum of Secondary Education in Modern India

After the declaration of the National Education Policy, 1968 NCERT prepared the framework of core curriculum for the first ten years of education in 1975, and after the declaration of the National Education Policy, 1986 it presented its new framework in 1988. This core curriculum was yet to be implemented properly in the country that NCERT in 20000 prepared another framework of core curriculum for the first ten years of education along with the curriculum for +2 levels. In the National Policy on Education, 1986 it was declared that the curriculum of any level of education would be revised after every five years. In accordance to it, NCERT presented a new framework of school curriculum in 2005 in which the secondary level curriculum is as follows:

Secondary level (Class IX and X)

1. Mother tongue (regional language)
2. English
3. Sanskrit/Urdu/Other language
4. Mathematics
5. Science
6. Social Studies (History, Geography, Sociology, Civics, Economics)
7. Computer
8. Work Education
9. Peace Education
10. Art Education

In this curriculum, besides what to teach, it has also been made clear that why to teach, how to tech and what should be the result of it. In this curriculum the study of three languages has been made compulsory. We find no logic behind it. In our opinion only the study of mother tongue should be compulsory and the study of any other language should be optional. Moreover the subjects like peace education should not be introduced at this stage.

Need and Importance of Secondary Education

There is a great difference in the psychology of infants, children, adolescents and adults. It is on the basis of their psychology that education is divided into different levels, namely – pre-primary (infant), primary (child), secondary (adolescent) and higher (adult). The aims and the curriculum for different levels of education are fixed differently. Secondary education is the education for adolescents; it is a formative education for them and herein lays its need and importance.

1. *Secondary Education is a complete unit in itself*: Although secondary education is a connecting link between the primary and the higher education, but in any country only a handful of students join higher education and it is for this reason that the education of the secondary level is developed as a complete unit. On its completion most of the youths enter the world of work and earn their livelihood by working in farmlands and different vocations. This is the reason that education up to secondary level is compulsory in all developed countries. At present, in our country, the goal is to make the education from class I to VIII free and compulsory, but in the 10+2+3 education structure, the goal is to make the first ten years of education free and compulsory.
2. *Secondary Education is the basis for the development of Manpower of any nation*: At the primary level, only general information are provided to children and they are trained in social etiquettes and behaviour but at the secondary level they are made a complete man, their ability to think and judge and to do work is cultivated and in this way the manpower of a country is developed. Thereafter, through higher education, only the intelligent students are developed in the form of specialised human resources.
3. *Secondary Education is the constructive and citizenship education of children:* At the Secondary level adolescents study. This is a very crucial phase in human development. It is the time period which makes the growth of human being. If the feeling of responsibility for the society and country is developed among them at this age level, they may prove to be a good member of the society and good citizen of the country. To provide proper direction to restless adolescents and to help them proceed in proper direction is one of the most important tasks of secondary education.

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4. *Secondary Education is the basis for higher education*: Secondary education is the basis of higher education, after its completion the students enter into higher education and prepare themselves to work in different specialized fields of life. In case if their mental level is not developed through secondary education and the habit of study and hard work is not inculcated among them, they fail to achieve higher education.
5. *Secondary education for most people in India is complete education*: For a vast mass of population, in any country, secondary education is a complete education and only the intelligent and able students go for higher education. It is for this reason that secondary education in most countries of the world is developed as a complete unit, such that it may develop the personality of children and may make them proficient in some vocation and may prepare them as a common citizen.

The reform in secondary education in India began during the British rule. After achieving independence our Government appointed Secondary Education Commission (Mudaliar Commission) in 1952 to suggest measures to reform the Secondary Education. This commission carried out an in-depth study of the existing secondary education and found the following demerits in it.

- Aimless Secondary Education
- Improper Curriculum at Secondary level
- Lack of uniformity in education at the secondary level
- Improper training of the secondary school teachers
- Defective examination system at the secondary level
- The 10+2+3 pattern of education is now accepted all over the country. Now there is no problem of the uniformity of secondary education. The aims of secondary education have also been specified, now no problem of aimlessness seems to exist at this level, though it is a different thing that most of the teachers do not make effort to achieve these aims.
- The Core Curriculum for the first ten years of education has been prepared and the guideline framework for +2 has also been prepared. But its nature in different provinces is different.
- Many reforms have taken place in the text books of secondary level. Their standard has risen. But along with it Question-Answer –books are also being continued which causes confusion.
- Useful reforms have been introduced in the training programme of secondary teachers. Though it's a different thing that the trained diploma or degree holder teachers derive benefit from it to what extent.
- The use of new methods and techniques of teaching has begun, but again their use is confined to a few specific fields only.

In the meantime, much reform has taken place in the field of examination and evaluation system at the secondary level. As, reform is a continuous process it should be carried out regularly.

3. Curriculum of Higher Education in India

Higher education in India was started in Vedic period, but before the advent of Europeans its curriculum was limited to the teaching and learning of language, literature, religions, philosophy, logic, ayurvigyan and different arts and crafts. The

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inclusion of European knowledge and science in it was first of all declared in Wood despatch, 1854. Thereafter, the *Indian Education Commission* (1882) and the *Calcutta University Commission* (1917) recommended to broaden it further. As a result, courses in Law, European medical system and engineering, etc. were started in the field of higher education in the country in every subject. The University Education Commission (1948-49) gave detailed suggestions in relation to the courses of higher education. Some of the major suggestions were:

- Graduate courses should be of three years
- Course of every subject at the graduation level should be widened
- At the graduation level, the national language Hindi, English, General Education and Religious Education should be made compulsory
- At the post graduate level intensive study of anyone subject only
- Courses of scientific, vocational and technical subjects should be widened and updated

Kothari Commission (1964-66) supported these suggestions and suggested to adopt an inter-disciplinary approach in the courses. The commission clarified that all knowledge is related to our life and it is a complete unit from this point of view. It further clarified that inspite of specialization there are many such facts which one finds in every subjects. Therefore, courses should be prepared in such a way that besides providing knowledge of any one subject (discipline) it should also clarify the facts of other subjects. This is termed as Interdisciplinary Approach in the field of education. On its suggestion, the University Grants Commission established 27 Curriculum Development Centres in the country, to restructure the curriculum of higher education. On the basis of the interdisciplinary approach the curriculums of humanities, social sciences and science subjects were prepared at these centres.

In the National Education Policy, 1986 it was declared that the present curriculum of higher education will be reformed, widened and updated. In the plan of Action of this policy, it was stated that the model curriculum prepared by the Curriculum Development Centres will be implemented and at the same time it was also stated that the curriculum of higher education will be reviewed every five years. In the meantime some universities have widened and updated their curricula, made them of international standard and at the same time have also made them activity oriented.

Currently Higher education is on the concurrent list in the Indian constitution, meaning that it is a shared responsibility between the Union or Central Government and the State Governments. The Department of Secondary and Higher Education is placed within the Ministry of Human Resource Development. There is also a Department of Education in each state. Higher education institutions are funded by the Central Government through the University Grants Commission (UGC), one of the statutory bodies, or by the State Governments. India, now proudly boats of the organisation of education of almost every subject developed in the world. But most of the universities have not adopted the model curriculum prepared by the Curriculum development Centres established by the UGC. A great explosion is taking place in the field of knowledge and science in the world, the universities therefore should keep changing their curriculum in accordance with it.

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Importance and Need of Higher Education

1. *Achievement of Higher Knowledge, Search of New Knowledge and Identification of Truth:* In higher education youths are provided higher knowledge.
2. *Preparation of the Specialist:* Through higher education specialist are prepared for different fields of life- religion, philosophy, engineering, medical, education, law.
3. *Development of Leadership Quality and Work efficiency:* Youths are prepared to skilfully perform any work of their interest which helps them to develop confidence and leaaership qualities.
4. *All Round Development of the Nation:* Two resources are required for the development of any nation. Firstly, its natural resources and secondly its human resources. The higher education is aimed at preparing good quality human resources. The economic development depends upon industrialization which in turn depends upon engineers, administrators, and scientists etc which are prepared through higher education.

Problems in Higher Education

1. After independence higher education had expanded to a great extent. The government has planned to establish higher studies institution in every state so the problem is not of the quantity but quality.
2. Problem lies with the administration, finance and control – there are three types of universities Central, State and Deemed. Funding policies vary in these universities. Under the political pressure many universities have been established but problem has arisen of its finance, control and administration.
3. Unrestricted advancement of the higher institution has taken place therefore not sufficient admissions are taking place.

7.2.2 State Council of Educational Research and Training (SCERT)

An Introduction SCERT

The establishment of the State Councils of Educational Research and Training have their own history in our country. The National Council of Educational Research and Training was set up in New Delhi in 1961. In 1967, the Andhra Pradesh government established the State Council of Educational Research and Training on its model. In 1973, then the Union Education and Social Welfare Ministry recommended that the State Institutes of Education (SIEs) and other equivalent institutions in all states be converted into the State Councils of Educational Research and Training. As a result, State Councils of Educational Research and Training came to be set up in different states. The National Educational Policy, 1986 attached importance to giving more rights and expanding the working area of the State Councils of Educational Research and Training, it also spoke of giving them autonomy. As a result, their rights and working scope expanded. At present, their main functions are to decide the form, aims and curriculum of the school education, in accordance with the National Educational Policy and its Plan of Action, and the specific needs of the states. They

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also develop suitable methods of teaching, techniques for evaluation of educational achievements and conduct research work in all these fields. Besides, they undertake inspection of schools and formulate and undertake training programmes for pre-service and in-service teachers.

Aims and Functions of State Councils of Educational Research and Training

The aims and functions of all State Councils of Educational Research and Training are almost the same. They are-

- To bring about qualitative improvement in school education of all levels
- To conduct academic research, expansion and training in the field of school education in the state
- To assist/advise the state education department about implementation problems, its policies and programmes
- To provide academic assistance by reorientation of educational content and experiments, and to give leadership and advise and suggest in this fields
- To organize innovative programmes for expansion and propagation of new trends and approaches related to education
- To organise creative programmes for all-round development of students, such as science fairs, drama, science seminars, youth parliament, writing contests debate contests etc.
- To publish educational literature

Departments of State Councils of Educational Research and Training

For the realization of the above aims and functions, there are a number of departments in each State Council of Educational Research and Training. Generally, the following departments are found in them.

1. *Primary and Adult Education Department*: Its scope covers primary and adult education. It plans primary and adult education, creates literature for adult education and reviews it.
2. *Language Department*: Its scope is school education. It works for skill development in communication of students', and conducts review and editing of papers and periodicals. It resolves any problems pertaining to the establishment of language laboratories. It also organizes birthdays of great people and thinkers for improvement in language.
3. *Science Department*: Its scope is school education. It organizes training programmes for science teachers and laboratory assistants and science seminars and science fairs for students, and guidance programme for district science specialists.
4. *Textbook Department*: Its scope is school education as well as primary teacher education. It undertakes the duties of constructing curriculum and textbooks for primary classes, to review textbooks from classes 1 to 12 and preparing workbooks for them.

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5. *Work Experience Department*: It works in the whole field of school education. It determines the area of work experience, discover methods for its arrangement, and trains in-service teachers in work experience.
6. *Educational Evaluation and Research Department*: Its scope is the entire school education. It trains the teachers in setting test papers and preparing blueprints, for them, holds workshops for continuous evaluation, conducts educational survey, constructs teacher handbooks, and establishes correlation with school education boards.
7. *Educational Technology Department*: This department organizes computer training programmes for teachers, and evaluates and records lessons of secondary and higher secondary levels under EDUSAT. It undertakes the duties of maintaining computer laboratories and studios, developing low cost teaching aids, and conducting research in educational technology.
8. *In-service Teacher Education and Extension Department*: Its scope is the whole of school education. It is responsible for preparing resource persons for training, organizing training programmes for DIETs and other equivalent institutions, holding conferences and seminars, and conducting action research and research.
9. *Population Education Department*: This department organizes awareness programmes in population education for school heads, administrative people and NGOs, prepares teaching-learning material for population education, organizes lectures, and crates awareness for women empowerment, HIV and AIDS etc., cultivates skill in youth, and review textbooks in the context in the context of population of population education.

Contribution of State Councils of Educational Research and Training in the Field of School Education and Teacher Education

The State Councils of Educational Research and Training are playing a vital role in all states in the fields of school education, school teacher training and adult education. We shall discuss in brief the contribution of State Councils of Educational Research and Training in the fields of school education and school teacher training.

Contribution in the Field of School Education

The scope of these councils pervades the whole school education from pre-primary in secondary to secondary level. Their contribution in the field of school education is as follows-

- SCERTs are constructing model curriculum for school education.
- They are preparing model textbooks for school classes.
- They are encouraging innovations for children of school level.
- They are constructing teaching aids for schools.
- They are constructing science kits for schools.
- They are preparing software related to school education and are arranging for their broadcast.
- They are developing technique for evaluation of students' achievements at school level.

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- They are conducting research work in the field of school education, and are effecting continuous modification in the field of school education.

Contribution in the Field of Teacher Education

The scope of these councils is the whole of school teacher education from pre-primary to secondary level. We shall discuss in brief their contribution in the field of school teacher education.

- They are constructing model training curriculum for school teachers.
- They are organizing in-service and pre-service teacher training at school level.
- They are organizing refresher courses for teachers.
- They keep control over all DIETs in their respective states, and render technical assistance in execution of their responsibility.
- The guide the DIETs.

7.2.3 District Institutes of Education and Training (DIET)

An Introduction to District Institutes of Education and Training

The National Educational Policy, 1986 announced several programmes for improvement in teacher education, one of which was the setting up of the District Institutes of Education and Training. Under it, the work of setting up of one such institute in each district was undertaken from 1987. By the year 2011, 555 District Institutes of Education and Training have been set up in the country.

The District institutes of Education and Training are being set up in the two ways: by raising the level of the existing primary teacher education institutions, and by setting up of new institutes. When it is established a new, the land is made available by the State Governments, and the rest of the expenditure is borne by the Central Government. As per the norms prescribed by the Human Resource Development Ministry, there should be about 10 acre of land for the setting up of a new District Institute of Education and Training. And its infrastructure should include principal office, staff room accommodation for principal and other staff, hostel facility, psychology laboratory, provision for an institute clinic and a part-time doctor. A library for it should contain about 10,000 books. An established institute should have a principal, a vice principal, 43 lecturers in different departments, 15 support staff, such as technicians and administrative officers etc. The newly established District Institutes of Education and Training should have a principal, 7 senior lecturers and 17 lecturers besides 23 other workers, such as technicians, laboratory assistant and clerical staff etc.

Aims and Functions of District Institutes of Education and Training

The aims and functions of the District Institutes of Education and Training can be enumerated as follows –

- To provide pre-service teacher education for qualitative improvement in primary education.
- To provide in-service training for primary school teachers.
- To provide in-service training for guides of informal education and workers in adult education

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- To arrange for refresh courses for principles of primary and upper primary schools and to construct innovate and micro-level projects.
- To conducts research work in the fields of primary, informal and adult education
- To run training programmes for community workers and other related people as per their needs.
- To establish evaluation centres for primary and upper primary schools and informal education and adult education centres.
- To organize extension services as resource centres and learning centres.
- To give educational advice and guidance to educational institutions, district education boards and school complexes.
- To arrange for decentralization of school administration and educational reforms.
- To construct educational plans at district level.
- To organize training programmes for resource persons working for universalization of primary education.
- To assist the district administration in running of primary, informal and adult education.

Departments of District Institutes of Education and Training

For the realization of the above aims and functions, different departments are set up in each District Institutes of Education and Training. In different District Institute of Education and Training of the country, there are different departments, units and cells. We shall discuss different departments of these District Institutes of Education and Training in brief-

1. *Department of Pre-service Teacher Education (PSTE):* This department arranges for pre-service training for primary teachers. These programmes are run by different names in different states, such as BTC, STC etc.
2. *In-service programme, Field Interaction and Innovation Coordination (IFIC):* This department is responsible for running in-service teacher education programmes and refresher courses for innovation. Also, it assists the district education administration in formulating educational project in the district. It duties include to find solutions to academic problems and effective use of innovative teaching technique.
3. *District Resource Unit (DRU)*: Its scope is adult and informal education. It coordinates adult and informal education programmes in the district and trains its supervisors.
4. *Planning and Management*: It trains principals of primary schools and block level education officers. Also, it assists in school mapping and micro-planning. Its duties include compilation of academic data and estimation of backward areas from academic viewpoint.
5. *Department of Curriculum Material Development and Evaluation (CMDE):* It develops primary teacher education curriculum. Also, it organizes workshops on evaluation techniques.

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6. *Department of Work Experience*: It prepares teaching learning material. Also, it assists primary schools, upper primary schools, adult education centres and informal education centres in work experience activities. It also holds community service programmes.
7. *Department of Educational Technology*: This department creates low cost teaching aids. It also maintains, computer laboratory and audio-visual aids, and gathers audio-video cassettes and teachers how to use slides in teaching.

Contribution of District Institutes of Education and Training in the Field of Primary Education and Primary Teacher Education

The responsibility of District Institutes of Education and Training is limited to primary education and primary teacher education. We shall discus the contribution of District Institutes of Education and Training in the field of primary education and primary teacher education.

Contribution in the Field of Primary Education

- These institutes are deciding and maintaining the form of primary education in the districts.
- They are constructing teaching aids relating to primary education.
- They are preparing software relating to primary education.
- There are developing objective methods for evaluation of students' achievements.
- They are trying to understand the problems of primary education and are finding the solutions to them; it is another thing that this work cannot be efficiently done in the absence of adequate human resources.
- They are conducting research work in the field of primary education; this is, however, another thing that this work is being undertaken by only 50 per cent of them.

Contribution in the Field of Primary Teaching Education

- These institutes are organizing primary school teacher training
- They are running refresher courses for in-service primary teachers; this is another thing that about 50 per cent of the District Institutes of Education and Training are running these.
- They are undertaking research work in the field o primary teacher education; though about 50 per cent of the District Institutes of Education and Training are engaged in this task.
- They are trying to understand the problems of primary teacher education and are trying to find their remedies.
- They are guiding other equivalent institutions in the district, of course, not all District Institutes of Education and Training are doing it.

Teacher Training Institutes

Elementary teachers are trained in Teacher Training Institutes (TTI, they are also known as Junior Basic Training Institutes or Primary Teacher Colleges) attached to

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State and university departments of education. The course generally lasts for two years and leads to a Diploma in Teacher Education or a Primary Teacher Certificate, P.T.C.

It is requisite for secondary teachers to hold a Bachelor's degree in Education or in a few instances a Bachelor of Teaching. The B.ED or B.T requires one year of fulltime study which is followed by a Bachelor degree, normally in arts, science, or commerce. Teachers at the upper secondary level usually are required to hold a master's degree in their area of teaching specialization. Four Regional Colleges of Education offer a combined four-year integrated programme leading to a Bachelor's degree.

It is mandatory for Teachers at colleges of education to hold a M.Ed. and a Ph.D degree. Studies for these are undertaken at a number of universities. Instructors in technical and vocational schools are normally trained in Central Training Institutes (CTIs), which offer one-year courses giving training in skills development and principles of teaching. Graduates of these institutions are awarded an Instructor Training Certificate.

The National Council for Teacher Education (NCTE) is entrusted by The Central Government with all the matters regarding teacher education of India, including the quality check, content and evaluation.

In the modern curriculum those subjects should be emphasised that are related to the needs of the present society. Along with this it should also be helpful in preparing students in vocational aspects.

The old curriculum that was Subject-Centred in olden times has now been modified into Activity and Child-Centred. The following comparison can be made between them.

S. No	Traditional Curriculum	Progressive Child-Centred Curriculum
1	Focuses on the bookish knowledge	Child is the centre
2	It is Subject-Centred	Activity and Child-Centred
3	It is not so flexible	Flexible
4	Does not pay attention to the individual differences of the students	It does pay attention to the individual differences of the students
5	Not in the interest of the nation	It pays heed to the nation's interest
6	No space for new technology	Gives importance to new technology

Since curriculum education is a developing process therefore it needs regular updating in reference to the technological advancements and needs. In this direction the suggestions given are as below:

1. In curriculum the research and experiments should be done by experts.
2. The books and other materials of aid should be developed keeping in mind the benefits of the students.
3. Teachers should be well updated with the new development thus In-service training should be organised.
4. The school and colleges should be given freedom to develop the curriculum as per their requirements.

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Critical evaluation of the existing curriculum

- The present curriculum has a very narrow attitude it is only meant for getting admission into higher institution.
- It emphasises on bookish knowledge because most of the curriculum is theoretical and classical at all levels of education. It is related to micro and general ideas only.
- In every subject is laden with so many ideas and facts that they put unnecessary pressure on the learning capabilities of the students.
- The approval of the perspectives of the 'experts' in the curriculum has brought great to the structure of the curriculum drafted because the experts have tried loss to include their content more and more in the curriculum. They do not keep in mind the interest, needs psychology of the child etc and only.
- The existing curriculum is not based on the concept of individual differences. In adolescent there are differences of opinion, attitude, aptitude etc. which does not seem to reflect in the existing curriculum.
- There is lack of establishment of proper Technical and Vocational courses.
- Too much pressure of tests and exams are there for the students and even the same for the parents.
- Much of the curriculum part is not related to the actual life therefore on completing the course students are not able to adjust to the environment.
- In the present curriculum there is too much inclusion of different subjects which may not have connection with each other. This results in the situation that teachers are not able to complete their courses on time and also no time is left for the activities.

Causes of the defects

In modern times there has been a lot of development in the cognitive aspect of the education and even the fundamental concepts have undergone restructuring in physical, biological and social aspects.

Due to the development and emergence of new concepts in the field of education there has increased the demand of extending the time period of the secondary education. Apart from this there is need of transforming education in accordance to the needs of nature.

Check Your Progress

1. What do you understand by the word curriculum?
2. Write in short the three-pronged strategy for universalization of primary education by the Indian government.
3. Why was National Open School set up?
4. Name the levels in which Indian education system is divided.

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7.3 PREPARATION AND EVALUATION OF A TEXTBOOK

A textbook or course book is a manual of instruction in any branch of study. The ancient Greeks wrote *texts* intended for education. Early textbooks were used by tutors and teachers, who used the books as an instructional aide. Before the invention of Greek alphabet 2,500 years ago, knowledge and stories were recited aloud, much like the practice in early Vedic period in India. The Greek philosopher Socrates (469-399 B.C.) lamented the loss of knowledge because the media of transmission were changing. The new technology of writing meant stories no longer needed to be memorized; a development Socrates feared would weaken the Greeks' mental capacities for memorizing and retelling. Paradoxically this fact is known from the writings of his pupil Plato in his famous Dialogues. The next revolution for books came with the 15th century invention of printing with changeable type. The invention is attributed to German metal smith Johannes Gutenberg, who introduced printing to Europe. Gutenberg was the first European to use movable type printing, in around 1439. Among his many contributions to printing are: the invention of a process for mass-producing movable type; the use of oil-based ink; and the use of a wooden printing press similar to the agricultural screw presses of the period. His truly epochal invention was the combination of these elements into a practical system which allowed the mass production of printed books and was economically viable for printers and readers alike. Gutenberg's method for making type is traditionally considered to have included a type metal alloy and a hand mould for casting type.

Printed books began to spread widely over European trade routes during the next 50 years, and by the 16th century printed books had become more widely accessible and less costly. Compulsory Education and the subsequent growth of schooling in Europe led to the printing of many standardized texts for children. Textbooks have become the primary teaching instrument for most children from the 19th century.

Though we find evidence to the composition of *hymns* and *slokas* of high quality in the early Vedic period but there exists no direct evidence that the art of writing was developed. Certain proofs of the existence of manuscripts, or even only authentic reports on the writing down of texts do not exist. During this period the entire teaching was done orally. The pupils were asked to learn Vedic matras by rote. In the absence of the printing press and paper, books were written with the hand on the leaves of the Tala and the Bhojas, hence they were difficult to be available to the masses. In course of time copper plates began to be used for the purpose.

After a few centuries one finds that certain books and treatises came into existence. During this period there existed a very primitive form of the concept of either curriculum or syllabus. It was during this later Vedic era that certain books that could be mentioned as textbooks were noticed.During this phase clear cut principles were also developed in textbook writing. However, even during this time, the textbook could not be produced on a large scale due to the non-existence of paper and the absence of printing technology. Thus, a textbook could not become the personal property of each individual student and definitely could not parallel the effective role that it plays in teaching-learning today.

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The Buddhist period witnessed the increasing growth and usage of books. While these books were mostly meant for the usage of the teacher, they were also used by the students as reference books. During these periods the textbooks performed threefold task. The first was to conserve knowledge, the second to transmit it to the succeeding generations and the third to establish religion and to stabilize the society.

The books initially written in the medieval period served the purpose for the *madrasahs* and *maktabs*. The art of printing still did not exist, the books were generally hand written and could not be produced on a large scale. However, slowly as the printing technology penetrated a larger number of books came out in Persian language. The emphasis was on religious teaching and thus secular subjects were taught to the students but were done from a religious point of view. A study of the books during this period brings out the lacunae persistent in the books during that era. The organization content of the book left much to be desired. The content and the first chapter were often in the same page and a new chapter often started where an old one ended. It is but obvious that it is poorer also in printing, binding and paper. It portrays its own story of the poor techniques used in its preparation. A very important aspect that can be contributed to this period is the concept of copyright. This was the beginning of the landmark in which authors had copyright of their work and in case of a second entity desiring to publish- it sought due permission from the author.

The advent of British in India also saw the opening of schools for their children. As printing had already developed in Europe, textbooks were beginning to be published. The credit for establishing printing presses in India and bringing out printed books goes to the missionaries. In the initial textbook the physical aspects were of poor quality and left much to be desired but the content was generally conditioned by religious thinking. As the British in India acquired political and administrative power they felt the need to educate a class of Indians to suit their purpose. The British period in India saw three types of schools. The first were Sanskrit schools. The second were the Arabic schools and the third the elementary vernacular schools. They also established institutions for higher education. Their interest in education and the establishment of these educational institutions during the 18th and the 19th centuries gave a big fillip to the production of textbooks. This was added to the advantage that printing press in India during this phase also developed considerably. However, the initial period was not without hurdles. People did not want the reputation and the livelihood of the calligraphist to diminish as the tradition was prevalent since the mughal period.

In the 19th century certain societies played a vital role in the promotion of textbooks. The names of the Calcutta school book society and the Bombay Native Education Society can be specifically mentioned in this regard. Once textbooks begun to be used freely in the newly established schools; they caught the imagination of pupils very soon and became popular with them. They also brought about radical changes in the methodology of teaching and also enlarged the scope of the subjects taught. With the introduction of school textbooks on a large scale, system of teaching by placing the people in different classes, with reference to similarity of ability or proficiencies also developed, thus the use of printed textbooks helped in evolving a system of education which proved useful in educating a large number of students in a short time. This helped in crystallizing the emergence of a formal system of education on a more sound footing in the country.

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The British administrators were quick to identify the potential in textbooks for spreading knowledge in various disciplines. They also recognized that a textbook and a printing press could be advantageous in spreading some of their ideas and strengthening their political interest in India. Consequently in some subjects, especially in social science and English, some textbooks were written and prescribed for the whole country. These textbooks generally contained subject matters which induced new ideas of loyalty towards the British regime. The Director of public administrations in each province kept strict control over the production and distribution of such textbooks. Secondly, some textbooks of the British Educational system, which could serve a similar purpose, were prescribed in India. History stands witness to the fact that textbook in the British period was used from time-to-time as an instrument for implementing foreign ideas in the Indian mind in order to strengthen British rule and weaken the Indian cultural tradition. While from 1854-1904 the subject matters in textbooks, especially in social science and English, had a definite slant in favour of all that was British it begun to present ideas of Indian culture and nationalism, quite positively, during the period between 1905-1947. This was mostly the result of the Swadeshi Movement of 1906, the non-cooperation movement of 1920-21 and the work of certain socio-religious organizations like the Arya Samaj. It will be interesting to point out that during the Non-Cooperation Movement even Mahatma Gandhi wrote a textbook for primary classes. During the same time, the development in agricultural and industrial fields, the changes in social and cultural ideas and the rise of the professional and middle classes also influenced a style and content of school textbooks considerably. Another interesting fact is that most of the textbooks prescribed earlier in the classrooms were British textbooks or their translated versions. However, during the years of 1905-1947 the textbooks used were written by the Indian authors writing from the Indian perspective.

The British period laid a concrete base for the selection, prescription and improvement of the textbook. The textbook committees were formed during this period. They performed certain functions related to textbook programme such as inviting manuscripts or books, evaluating them, approving or prescribing them and taking steps towards their further improvement. This period also witnessed the development of the proper procedure of textbook evaluation. Parallel can be drawn between the system prevalent then and now in the selection, prescription and evaluation of textbooks. The prevalent practice was that of the Education Department to prescribe a few textbooks in each subject for each class. This gave latitude to the teachers to exercise their choice on books that best served their teaching-learning purpose. This also helped to evade monopoly that would otherwise develop on option of having a single text assigned to a particular class.

Nationalization of textbooks was resorted to spread mass education in the post-independent period. Each state adopted its own policy in matters regarding preparation, production and prescription of school textbooks. Most of the states initiated the process of nationalization of school textbooks in a phased manner. The nationalization of school textbooks was initiated by Uttar Pradesh in the year 1941-42. By the end of year 1978-79, all the states except Meghalaya and Manipur, had adopted the programme of nationalization of their textbooks. Some states had nationalized the textbooks of the entire school stage. The other states were at various stages of nationalization of

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their textbooks. Since Independence the number of nationalized textbooks was continuously increasing. The extent of state control differed from state to state. Some states exercised complete control on preparation of syllabus, preparation of manuscripts, evaluation, production, pricing and distribution of school textbooks.

The following concepts became well established. The clientele of the textbook, the mode of printing and the nature of artwork for illustration are also decided. Whether the textbook should be written by a single author, or a panel of authors is to be engaged for this purpose. The author decides in advance the important sources of information to be consulted. The course outline suggested in the syllabus is suitably broken up and planned in terms of selection and chapters. The content outlines are developed accordingly. The chapter outlines are discussed with a selected group of subject experts, pedagogics, psychologists and classroom teachers. These acted as criteria for the process of evaluation of textbooks and went a long way in the all round development of a textbook in the modern period.

Technological advances have changed the way people interact with textbooks. Online and digital materials are making it increasingly easy for students to access materials other than the traditional print textbook. Students now have access to electronic and PDF books, online tutoring systems and video lectures.

In the earlier paragraphs you have got acquainted with the origin and development of textbooks. You understand its need and how it has been instrumental in spreading education and mass literacy. As the quality of printing the textbooks increased the same could not be said about its content. As the first commission post independence: 'The University Education Commission' remarked, 'One of the evils of the present method of instruction is that it is focussed too much on textbooks. This evil is most pronounced in the study of the languages and therefore it has become almost a racket. A textbook is prepared with very little effort as it consists of a number of pieces selected from different authors, a few copyright pieces being included with permission to prevent the pirating of the selections, and then the publisher and author do their best to get the book prescribed by a university or a board.' It further states, 'In other subjects, too, the evils of the textbook system are manifest. In history for example, know that the questions in public examination will be set from the prescribed works and the teacher must make a point to summarise the books for the benefit of the students in great detail, while the student knows that the best prospect of success in the examination is through cramming up of the summaries, or better still, the book itself. This practice extends to mathematics and science subjects.'

The Secondary Education Commission (1952) pointed out that the then curriculum was 'narrow, bookish and theoretical' with an overloaded syllabus and unsuitable textbooks. It had suggested that the curriculum should not be divided into a number of watertight subjects, but that all subjects should be interrelated and should include relevant and significant content so that it could touch the lives of students. It also recommended that a high powered committee be set up in every state for selecting textbooks and for laying down appropriate criteria, emphasising that 'No single textbook should be prescribed for any subject of study, but a reasonable number which satisfy the standards laid down, should be recommended, leaving the choice to the schools concerned.'

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The subsequent Education commission (1964-66) continued to highlight the poor quality of school education and commented on the low quality of textbooks, owing to the lack of research related to their preparation and production, and the lack of interest of top ranking scholars in this area. It called for the definition of 'national standards' and recommended centralized books at the national level and also supporting establishment of bodies at the State level.

The commission in its report clearly stated that 'At present there is hardly any common book which all the students in India read and is one of the reasons why our educational system contributes so little to national integration.' As a solution it calls for the publication of textbooks at the national level for defining national standards where 'such books can indicate the expected standard of attainment far more precisely than any curricula or syllabi.'

We can say that the problematic role of the textbook continuing from colonial education system is at the root of these over emphasis on textbooks and the marginalization of the role of curriculum. As Yashpal Committee in its report 'Learning Without Burden' states, 'If "facts"; or "information" constitute the main burden of an examination, the same is true for textbooks. Barring exceptions, our textbooks appear to have been written primarily to convey information or 'facts', rather than to make children think and explore. Over the years some attempts have been made to incorporate a certain amount of reflective writing in textbooks. Such writing is so exceptional that its examples can be spotted and named without difficulty.'

The major challenges that need to be met are:

- Great demand for education and its rapid expansion, requiring a large number of textbooks.
- Deteriorating quality of secondary education.
- Problems of mass illiteracy, especially among the weaker section of the society.
- Caste and communal turmoil and decisive tendencies in the country.
- Problem of making education more purposeful and needful.

The challenges are being met by the following major responses:

- The publication of a single textbook by NCERT to be followed throughout the country.
- Deterioration of secondary education was taken care of by producing new textbooks for all classes under the new ten plus two pattern of education.
- NCERT has been doing commendable work in providing a lead in this direction.
- Number of programmes of non-formal education, especially for children of the weaker section of the community were organized to meet the challenge of mass illiteracy. These programmes mostly catered to the needs of the children belonging to the age group between 9-14.
- NCERT through various State level centres of non-formal education was also doing considerable work.
- The fourth challenge of caste and communal turmoil and decisive tendencies in the country made partly by education through improvement of textbooks.
- NCERT organized programmes for evaluation of textbooks in various subjects from the point of view of national integration.
- Making education more purposeful and need based was being made by various central and state level programmes.
- The UNESCO and the UNICEF assisted programmes like science education programme, primary education and curriculum renewal, development of community education and participation.

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Essentials of Good Textbooks

A good textbook can help to structure content and provide solid groundwork for further learning. For the inexperienced teacher especially, the textbook may provide information in a well-organized, coherent framework and could well save their precious time that might otherwise be used for research rather than for preparing ways of making the material interesting to students. Moreover, the instructor is responsible for structuring the presentation of the material in ways that appeal to students with all possible kinds of learning styles. Textbooks are often rife with inaccuracies, biases and outdated information. Whether presented as a book, interactive CD, or online, texts and instructional resources must be selected carefully and questioned critically. History texts in particular are biased with a Eurocentric view. As teachers select materials to reflect the cultures represented in their classroom, they must not neglect those that are not. Textbooks, in whatever form, can be very influential, and we must ensure that students understand how they are presented. Students should be taught to question the information in any text and to look further for additional information.

It is the time of Manu and Panini that the principles of textbooks were developed. The principles were as follows:

- Objective of the book: While writing the textbook author must keep in mind the objectives.
- Correctness of the content: The writer should use correct content for writing a textbook.
- Completeness of the content: The author should cover complete content in the textbook.
- Relevance of the content: The author should keep in mind the content given in the book is relevant to the theme of the book.
- Presentation of the content: content should be presented properly by dividing the contents into proper sections and subsections and their proper arrangement.
- Style of writing: The author should develop styles of writing. This means vivid expression, lucidity and dignity.

Although there are no such criteria which could be used for evaluating textbooks in the ancient period, the above mentioned principles could well be used as criteria for evaluating the books of those days.

In the later Vedic and Buddhist period merit was the main criteria of selection of a textbook. Authors used to write books not for monetary benefits but for fame and reputation. In the later Vedic period, considerable foresight and good techniques were used in preparing a textbook. The famous physician Charak while discussing, prescribes certain rules and procedures which an author should follow while writing a good textbook. Some of the rules are as follows:

- That is suited to understanding of three kinds of people.
- That is free from tautology and verbosity.

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- That is well complied and rich in aphoristic wisdom.
- Giving commentaries and abstracts in due order.
- That treats the subject concern without deviating from it.
- That is free from slang and provincialism.
- That contains low obsolete or unfamiliar and unexplained terms.
- That is couched in words of general comprehension. That contains abundant example.

During the medieval period, textbooks were written generally by the school teachers, the teachers while writing the book considered psychology of the children and day-to-day problems in the classroom. While writing a textbook, during this period, the author used to select content on the basis of two principles, one was the mental maturity of the intended age group for whom the book was to be written. Second consideration related to certain demands and compulsions of religion. The main features in the books were:

- **Organization of content:** The subject matter of textbook was divided and organized into units or chapters. The chapter numbers were mentioned on each page in bold letters.
- **Presentation of content:** The titles given to the chapters were brief and meaningful. The content was generally presented in a creative and interesting manner to attract reader's interest.
- **Language:** The style of language in the popular books like *Gulistan and Bostan* appeared to be appropriate for effective communication. The sentences were simple, short and language was lucid.
- **Illustration:** In the medieval period, illustrations were few or no illustrations at all. Illustrations did not supplement the text on the whole.
- **Learning assignment:** In the medieval period, exercises were absent in the Urdu and Persian textbooks. The students were asked to memorize the books through repetition.

Throughout the British period and with the advent of modern technology in the post independent era the quality and quantity of the textbooks both increased many folds. Thus, it became important to have parameters for the essential characteristics of a good book. Important characteristics and qualities of textbooks which an author must keep in mind while preparing the layout of a book as well as while organizing the content for the book are listed below:

1. Text-books that are intended to be used should be useful for the students as well as teachers. They should be so designed that on one hand they may be written according to the psychological requirements of the students and on the other they should serve the purpose of the teacher who wishes to impart knowledge to the students in a successful and interesting manner. It should provide sufficient material to motivate the students to solve problems.
2. The language of the book should be simple, clear, lucid, scientific and precise. The English equivalents of the terms should be always given in brackets. Selected topic should be properly integrated from the preceding to the succeeding class or stage.
3. The exterior of the picture should be attractive. If the exterior is attractive, students would like to carry them and keep them. This is true of the books intended for primary classes.

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4. They should serve the purpose of the subject matter as well as the aims and objects of teaching. They should be written after taking into account the aims and objects of teaching.
5. Subject matter should lead to inculcation of scientific attitudes, disciplinary and cultural values.
6. The textbooks should be accurately written. They should present the subject matter in such a manner that there is no fault in them. The subject matter, presented therein should be up to date.
7. Textbooks intended for the students of the primary classes should be written in a story form. In the textbooks meant for higher classes the author may use the regional method or some other method that is useful for the students of the stage.
8. The textbooks should contain all the necessary and relative material required for a particular stage of education. Examples in the textbook should be given from the local environment and from life experiences.
9. The textbooks of different stages should be complimentary to each other. Textbooks that are used in primary classes should have some bearing and connection with the textbooks that shall be used by the students in the Junior High School classes.
10. Textbooks should be free from prejudice. The presentation of the subject-matter should be unbiased. There should be no material which can injure the susceptibility of any class or category of people. They should contain objective description of the people and conditions of different countries.
11. The textbooks should contain charts, maps and diagrams as and where required. Without the charts, maps and diagrams the subject matter of geography cannot be taught properly. It is, therefore, necessary to give place to all these things in the textbooks. The illustration should be purposeful and appropriately placed in the textbook.
12. At the end of every chapter of the textbook there should be certain questions that may be used for the revision of the subject matter. Without these questions the textbooks shall not be useful. Each chapter should contain assignments at the end. These exercises should suit the special needs of the gifted as well as slow learners.
13. If required the textbooks may give a summary of the chapter at the end of each lesson. Such a provision will help the students to grasp the subject matter properly. The technical term should be used properly and suitably explained whenever necessary.
14. The problems should relate to the real life needs and physical and social environments of the learners.
15. The students should get adequate opportunity of learning through initiative and independent efforts.
16. It should promote the use of analytic, synthetic, inductive-deductive, problem-solving and heuristic approaches to teaching.
17. It should foster the right attitude towards self-study and self-reliance among pupils and it should be done by promoting project works, field works and laboratory works.

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After the author has finished the task of preparing a book, now it is ready for the publishing house to take charge. The quality of a good book also depends upon the publishing house to a great extent. A well written and organized book may not serve its purpose unless it is printed properly. Therefore, the essential points that are to be kept in mind while printing the books are the following:

(a) The print and paper used and the binding of the textbook should be attractive. It should be hard and durable.

(b) The printing should be clear, legible and appropriately spaced.

(c) Headings and sub-headings are given in bold letters.

(d) Each textbook should contain detailed Table of Contents and an index.

(e) The size of the book should be handy. It should be possible for the students to carry them properly. They should not be bulky. This is especially true about books intended for the primary classes.

(f) Printing and presentation of the books should be interesting and attractive. The font size used should be such that the text is easily readable. On the other hand, they should be correctly and neatly printed.

(g) It should be free from mistakes.

(h) There should be diagrams and figures wherever needed.

(i) The left hand, right hand, top and bottom margin should be appropriate. Spacing between lines and paragraphs should be appropriate.

(j) The type size used for chapter title, subtitles, footnotes and exercises should be suitable for the age group of students.

(k) Index should be given wherever possible. Glossary should be given in proper language.

(l) Bibliography should be given correctly and according to the uniform system.

(m) The title page should give necessary information i.e. suitable title, author's name, publisher's name, place of publication and year of publication.

(n) The quality of the paper should be in accordance with the cost of the book. Paper should be durable enough in accordance with the expected life of the book.

Besides these characteristics, the UNESCO Planning Mission has given some principles of writing textbooks in U.S.S.R. and other countries. The knowledge of these guidelines can be useful for the prospective authors who make them a powerful author. They are as follows:

(i) It should be first of all according to the requirements of the syllabus. It should also help in the improvement of the syllabus.

(ii) The factsand concepts should be modern and within the comprehension of the pupils.

(iii) The contents should contain not only the established facts but also the problems which are being researched and thereby, arousing curiosity in the pupils about these problems.

(iv) It should help in linking up science with life and practice. The pupils should be equipped with 'know-how' utilizing knowledge in everyday life.

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Selection of Textbooks

A book should be well evaluated before its selection. The British regime entrusted the selection of textbooks to its Education Department. There was considerable criticism regarding the quality of the textbooks and the procedure of their selection. As a result of this criticism a Textbook Committee was formed in Bengal. During this period certain criteria were fixed for selecting, prescribing, improving or even removing textbooks from the curriculum. Some comments of the head master and teachers can be seen on the book *Citizen of India.* On the basis of this comment and certain other material, it is said to conclude that during this period there not only existed a procedure of evaluation of textbooks but also a well said criteria of evaluation. The following were the criteria for evaluation:

Selection of content

- Adequacy of content
- Redundance of material
- Mental maturity of students
- Accuracy and authenticity of content.

Presentation of content

- Presentation of the matter in such a manner as to sustain the interest of learners.
- Adequate converge of terminology.
- Evaluation of topics with the help of examples from the local environment.

Language

- Appropriateness of vocabulary
- Appropriateness of style for effective communication.
- Proper use and explanation of technical terms.

After World War II, public opinion showed great enthusiasm in the field of International understanding. The UNESCO took up the matter with great zeal. Following criteria for evaluation of textbooks especially from the standpoint of international understanding were developed:

- How accurate is the information included?
- Is the interpretation of events and the generalizations about them adequately supported by the facts presented?
- Are important terms accurately and clearly defined?
- Are illustrations, charts, graphs and maps representative, accurate and up-to date?
- Are minority groups, other races, nations and nationality treated fairly and justly?
- Is due representation and recognition given to their contributions?
- Are the same standards of scholarship, justice and morality applied to other nations and groups as to one's own?
- Are controversial issues presented objectively?
- Are words and phrases, misunderstanding and conflict avoided?

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- Are the text, illustrations and exercises of worth and relevancy in the development of knowledge, attitudes and skills necessary to be effective living in the modern world?
- In terms of the subject and agegroup is there adequate information on world geography and history about the author's of other nations and on contemporary International relations and problems?
- Is the material presented well balanced in selection and in interpretation?
- Are the ideas of human freedom, dignity, equality and brotherhood given adequate emphasis and support?
- Is the need of a moral code of conduct and a sense of common responsibility for world conditions emphasized?
- Are the advancements of civilization emphasized?
- In a history textbook, is there adequate information on the history of a force to develop peaceful relations among nations?
- If appropriate to the subject is their adequate information on the United NationsAnd about the specialized Agencies?
- Is the need for international organization and corporation recognized?
- If appropriate to the subject, is the concept of a just, peace and international cooperation and law made clear?

NCERT developed detailed criteria for evaluating content in various school textbooks. It has done a commendable job by listing systematically the evaluation criteria that were based on the knowledge and experience of textbook authors, subject specialist, psychologist, educationist and pedagogists.

Criteria for academic aspects

1. Selection of the content

- The textbooks cover all the topics and subtopics given in the syllabus. It consists of instructional material which is based on the predetermined course of study i.e. prescribed syllabus.
- Selected copies are properly integrated with the text of the preceding class and the following class.
- The selected content is in respect of the duration of the course and the numbers of periods allotted to a particular subject.
- The textbook does not include any redundant material. However, it should be ensured that adequate material is provided for explaining various terms, concepts, principles and generalizations.
- Scope of the topics and selected content is as per the mental maturity of the intended age group of students.
- Content included covers the needs of the average and intelligent students.
- Content is accurate in respect of concepts, terms and facts and statistics.
- Information is culled from authentic sources and correct use of terms and concepts is made.
- The sources of statistical and other information are preferably stated separately.
- The information included in the book is up-to date.

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2. Organization of content

- The subject matter or content is organized into suitable units and chapters.
- Chapters are properly paragraphed. This helps in the clear exposition of the subject matter.
- The sequence of chapters is logical. These ensure continuity of ideas.
- Length of different chapters is appropriate.
- There is not much variation in the length of chapters.
- The chapter headings are appropriate and convey the central idea of the whole chapter.

3. Language

- Language used in the textbook is simple correct, precise and comprehensible.
- The vocabulary used is appropriate keeping in view the age groups of the students.
- Structure of sentences is appropriate. It is simple, short and clear.
- The spellings are correct. There is also consistency in the spelling of a particular word throughout the book.
- Punctuation is correct.

4. Presentation of the content

- The pedagogic considerations should be considered.
- Simple to complex: The subject matter is presented in increasing order of complexity.
- Familiar to unfamiliar: The concept and subject matter of the topic are developed and explained on the basis of previous knowledge and experience of students with the help of common and familiar examples.
- Specific to general: The definitions and generalizations are logically deduced with the help of specific facts and concepts.
- Interest of the student is sustained throughout the book.
- Due weightage is given to the treatment of various topics.
- Adequate reinforcement of new items of learning is provided through replication and application.
- Adequate coverage of terminology relevant to the syllabus is provided. The terms are also effectively explained.
- Opportunities are given to the readers to enquire into problems, interpret data, draw inferences, and verify them thus arriving at rational decisions.
- Due place is given to the inter-disciplinary approach wherever possible and appropriate.
- It promotes the habit of independent study. It also gives reference to relevant reading material of other sources.
- It helps to inculcate desirable values and attitudes and acquire desirable skills.

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5. Illustrations

- Illustrations are adequate enough to cover all significant aspects of the text which need to be illustrated. The illustrations supplement the text.
- A variety of illustrations, which might be necessary to illustrate various topics in the textbooks are used.
- The illustrations are useful in explaining the text and making it more meaningful. They are accurate in every respect and are clear and vivid.
- Illustrations are properly captioned.
- The illustrations are of suitable size.
- They are properly placed in the text.

6. Exercise and assignments

- The exercises help in testing pupils' knowledge including critical thinking and skills.
- The exercise is suited to the mental maturity of the students.
- The exercise helps the pupils in reviewing and recapitulating the main text.
- The language of the exercises is unambiguous.
- The exercises promote the spirit of enquiry.
- The exercises provide motivation for further study.
- There are a variety of exercises (essay type, objective type, short answer type and fill in the blanks.)
- Exercises are given at the end of each chapter, besides there are some exercises given at the end of the book focussing on understanding of the concept and skills explained in the entire book.
- There are exercises that suggest activities to suit the needs of the gifted as well as slow learners.
- There are exercises that suggest activities which are likely to foster desirable habits and desirable patterns.

Further suggestions were also given on prelims, back pages, printing layout and getup, durability, size of the book and the price.

As you have read till now it is very difficult to choose the right textbook. It is not a straight forward or clear process. It takes into account tiny details of every aspect of a textbook. We may discuss it under three aspects:

Selecting it from the Teacher's point of view

The first question to ask when choosing a textbook is, what are you intending to do with it? And how does it fit with the way you teach? You may be a constructivist teacher and choose a slightly different textbook that will let students question their learning or fill in the gaps or it covers the course comprehensively. Thus, the textbook will cover the gaps that are left in classroom teaching by building basic concepts, introducing activities and providing supplementary information whenever necessary. While using a textbook as the guide to teach in the classroom calls for selecting it

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based on how content has been divided into selected content and comparatively small and manageable chunks that guide readers through a learning process, and provides opportunities for self-assessment.

Selecting from the Student's point of view

While selecting from the point of view of the student one should ask the question that why are students opting for this course? Whether they will pursue the subject further or whether your course is the last one that they will ever take on that subject? The answer should help guide your textbook selection. Matching textbooks with the requirement of students means whether the textbook is able to enhance the learning of the students or not. A 'difficult' text is one that leaves out some sections of the process of thought, assuming that the reader is intelligent enough to fill in the gaps. Hence, you should not select a textbook without first reading some portions of the narrative to find out whether it is the appropriate textbook for students to enhance their learning.

If a textbook is properly planned and utilized then it will be a useful tool for both the teacher and student. It can help in the following manner.

- It gives the meaning and purpose of the teaching- learning process.
- It keeps the teacher on guard against any haphazardness and unnecessary repetition and learning.
- It facilities and stabilizes student learning.
- It lays down examples of the manner to be learnt.
- It serves as memory tool for the pupils.
- It reinforces what the students have learnt orally.
- It prepares ground for writing.
- It helps for supplementing pupils' language experience.
- It serves as a guide to the teacher.

One may conclude that while selecting a textbook one should at least briefly consider the following:

1. **Scope:** Does the textbook provide an adequate overview of relevant topics? Compare the topics of the textbook to the objectives of the class. Will there be any requirement for additional textbooks?
2. **Content:** Does the book cover the relevant topics? The size and readability of the book provides the students enough time to meet course objectives.
3. **Organization.** Is the textbook well organized? Review the table of contents, chapters, appendices, glossary and index. Compare the chapters and major headings to your course objectives and the sequence of your course materials.
4. **Contemporary:** To provide students with the most current information available
5. **Supplemental Materials:** What supplemental publisher resources are available? Have supplemental websites, workbooks, study guides, videos and test banks been provided?
6. **Cost:** The costs of textbooks should be minimized. While a book may not cover all topics in an ideal manner, a reasonable goal is to select one that is as complete as possible.
7. **Student:** Consider the text in light of the students who will be using it. Is the reading level appropriate? Does it repeat information included in a different course? Will the student be able to comprehend easily what is given in the text?

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7.4 CORE-CURRICULUM

Core Curriculum

In education, a core curriculum is a curriculum, or course of study that is deemed central and usually made mandatory for all students of a school or school system. But, this is not always the case. Like a school might mandate a music appreciation class, but students may opt out if they take a performing musical class, such as orchestra, band, chorus, etc. Core curricula are often instituted, at the primary and secondary levels, by school boards, Departments of Education or other administrative agencies charged with overseeing education.

Advantages

The advantages of core curriculum are as follows:

- Those students who take the ACT-recommended core curriculum in high school get better ACT scores than those who do not, irrespective of gender, family income and racial/ethnic background.
- Usually in all racial/ethnic groups, those students who take the core curriculum score between 1.6 and 2.8 points higher on the ACT composite than those who do not take the core.
- Taking upper-level courses beyond core improves the achievement of all students, irrespective of gender, family income and racial/ethnic background.

Disadvantages

The disadvantage of core curriculum, which consist Math, Science, Social Science and English, is that you take most of these courses in high school, but colleges go more in depth with these subjects whereas high school gives only a gist. Let us imagine that you go to a University/four year college and are undecided. You have a lot of time to choose a major as the first two years of college is mostly completing core classes, but it can be very helpful to choose a major as each major has its own prerequisites (core curriculum), which relates to it solely. The reason for this is said to make a better-rounded student, knowledgeable in different areas and to refresh and reinforce the information learned in high school.

Curriculum development in India falls between the two extremes of centralization and decentralization. At regular intervals, the national government creates the national policy on education. This policy is inclusive of the various guidelines pertaining to content and process of education at different stages. The guidelines mentioned in the national policy of education are also elaborated by NCERT.

NCERT has launched two curriculum initiatives by using NPEs of 1968 and 1986 as its base:

(a) The Curriculum for the Ten-Year School-a framework (1975); and

(b) The National Curriculum for Elementary and Secondary Education-a framework (1988).

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At the central level, the curriculum framework that is prepared provides a broad outlook of the school curriculum that includes the following:

- General objectives
- Subject-wise objectives
- Suggested scheme of studies
- Guidelines for the transaction of the curriculum
- Evaluation of pupil outcome

At the national level a detailed curricula, syllabi and instructional material is developed. The NCERT also develops syllabi and instructional materials that are used by schools run in central organizations.

However, it is the state's decision to decide whether they want to adopt or adapt NCERT syllabi and instructional materials. Therefore, curriculum framework put forward by NCERT is always considered to be a suggestion and is not enforceable by law in the states. It is usually readily accepted by the states due to NCERT's credibility and the participatory development approach it follows. (The NCERT curriculum framework is developed on a consensus basis; all the states and union territories are involved in the curriculum elaboration).

CHECK YOUR PROGRESS

5. Who was the first to print a book mechanically?
6. What were the means of writing in the early Indian education system?
7. Name two societies which played a vital role in the promotion of books in British India.
8. What were the main functions of books in the ancient and medieval period?
9. What are the major principles of developing a textbook during the age of Manu and Panini?

7.5 ACADEMIC TIME IN THE IMPLEMENTATION OF CURRICULUM

Since Education is on the concurrent list, the curriculum is being brought into force in a different way by different states and union territories. The weightage to diverse curricular areas varies across states/UTs.

1. Primary stage

Classes I to IV in seven states/ UTs. In remaining 28 States/UTs it has classes I to V.

- The total *school working days* in a year are minimum of 180 in Nagaland and Manipur and maximum of 253 in Bihar and Jharkhand. In more than sixty per cent of the states/ UTs, the working days are between 201 and 220.
- The *duration of school hours* is 2.30 hours in Assam. In a majority of States/ UTs, it is between 5.30 to 6.30 hours.

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- The number of periods *per week* for teaching different subjects is between 19 in Madhya Pradesh to 48 in A&N Islands, Uttarakhand, Goa, Tripura, Himachal Pradesh and Uttar Pradesh.
- The *duration of a class period* is minimum of 35 minutes in 5 states and maximum 45 minutes in 13 states.
- The integrated approach is followed in the teaching of Environmental Studies in 29 States/UTs.
- 9 periods per week are allotted for teaching of science in Rajasthan
- 4 periods are fixed in Andhra Pradesh, Pondicherry and Uttar Pradesh.
- 6 periods are allotted in 16 of the States/UTs.
- The *social science* is named as 'Environmental Studies' in 29 States/UTs and social studies in 4 states.
- In 30 States/UTs, integrated approach is followed in the teaching of social sciences in class V. The periods per week for teaching of this subject vary from 4 to 9 in different states/UTs.
- The time allowed for annual examination is 2.0 hours and maximum 3.0 hours in different states/union territories. Maximum marks for annual examination are 100 in 24 States/UTs and minimum 50 in ten states.
- *Periods allotted per week for teaching of Mother Tongue* in Class V is a minimum of 3 Nagaland and a maximum of 13 in Maharashtra. The time approved for annual examination of this subject is minimum 2.0 hours and maximum 3.0 hours in all States/UTs.
- English is introduced in Class I in 26 states and union territories.
- The *periods allotted per week for teaching of English* in Class V are minimum 3 and maximum 8 in various states
- The time allowed for *annual examination* is minimum 1.30 hours in Sikkim and maximum 3.00 hours in 15 States/UTs.
- The maximum marks set for yearly examination are 100 in 22 States/UTs.
- *Periods allotted per week for teaching of Mathematics* in Class V is maximum 12 and minimum 5 allowed on for annual examination is 2.0 hours in about half the States/UTs and maximum of 3.0 hours in fifteen States/UTs. Maximum marks for annual examination are 100 in 25 States/UTs and 50 in nine states.
- In most of the States/UTs, *health and physical education* is a compulsory subject,
- The time allowed for annual examination is 1.30 hours to 3.00 hours in all the States/UTs.
- Periods per week for teaching Class V ranging from minimum 1 to maximum 7.
- In a majority of States/UTs, Art *Education* is a compulsory subject with period ranging from1-6 in different states.
- The time given for exam is from 1.0 to 3.0 hours in all the States/UTs. Both marks and grades are used for evaluation purposes.

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- The nomenclature of *Work Education* is 'Socially Useful Productive Work (SUPW) and Work Experience' in equal number of 12 States/UTs, and Work Education in 4 States/UTs. Life Oriented Education (LOE) is given in Tamil Nadu.
- Both marks and grades are awarded in the examination. The number of periods allotted per week for teaching of work education in Class V ranges from 1 to 7.
- *Periods allotted per week for the teaching of moral and value education* in class V is varied from 2-4. marks and grades both are used optionally for evaluation.

Upper Primary Stage

- The *upper primary stage* includes classes VI to VIII in 27 States/UTs, VI & VII in Andhra Pradesh, V to VII in six States/UTs and V to VIII in West Bengal.
- T*he number of working days* ranges from 180 to 253 in different states
- The *duration of school hours* is from 5.00 hours to 7.00 hours in all the states.
- The *number of periods per week at upper primary stage* varies from 35 to 54.
- *Minimum 35 minutes to maximum45 minutes is duration of a period.*
- In a majority of States/UTs, there is only one *recess* period maximum up to 3 in some states with time duration varying from 15-80 minutes.
- *Science at the upper primary stage* is named as 'General Science' in 15 States/UTs. 'Science' in 14 and Physics, Chemistry and Biology in West Bengal. The integrated approach is followed in the teaching of science in 21 States/UTs and disciplinary approach in 13 States/UTs. The periods allotted per week to science in class VIII vary from five to eight. The time authorized for annual examination of this subject varies from.2.0 hours to 3.0 hours. The marks given are from minimum 50 to maximum of 100
- The different *nomenclature of Social Sciences* is 'Social Studies' 'History, Geography & Civics' and 'Social Sciences'
- P*eriods per week* for teaching of social sciences are two to maximum eight The *time allotted* is from 1.0 hours to 3.00 hours for *annual examination.*
- The *marks allotted* for annual examination vary from 50 to 200.
- The number of periods per week for *teaching of mother tongue* varies from 4 to 13.
- The *periods per week for teaching of English* in class VIII are from minimum five to maximum nine
- In annual examination time given is between 2.0 hours to 5.40 hours and the marks allotted are from 50 to 100
- The *periods allotted per week for teaching of Mathematics* in class VIII are minimum five *in Kerala, Meghalaya and Nagaland* and maximum 9 in Jammu and Kashmir. Examination time is 1.0 hour to 3.0 hours and the marks allotted for annual examination are 50 to 100
- *Health and Physical Education* is a compulsory subject in a majority of States/UTs. The periods allotted in time table per week for teaching of *Health and Physical Education* in class VIII is minimum 1 to maximum 5

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- *Art Education* is a compulsory subject in 29 States/UTs and optional in remaining five States/UTs. The periods allotted for teaching of Art Education in class VIII is minimum one maximum six.
- *Work Education* is named as Socially Useful Productive Work (SUPW) in 13 States/UTs and Work Experience in 14 state/UTs. Only in Tamil Nadu Work Education is known as life orientation education.
- *Moral and Value Education* is taught at upper primary stage as a subject in13 states. Periods per week are 3-5.
- In *evaluation*, marks and grade both are functional.

The continuous comprehensive evaluation (CCE) is implemented in 16 states only.

2. Secondary Stage

- *Secondary stage* consists of classes IX and X in 28 States/UTs whereas in remaining seven States/UTs, it consists of classes VIII to X.
- The *curriculum and syllabus of NCERT* is followed in nine States/UTs with needed alterations as per requirement. The Boards of School Education/ Board of Secondary Education are accountable for constructing curriculum and syllabus in 16 states. The SIEs/SCERTs of eight states are also developing curriculum in some states.
- The number of *working days in a year at secondary stage* is a minimum of 160 maximum of 259.
- The *duration of a school day* is minimum 5.0 hours and maximum 6.30 hours
- The *number of periods allotted per week* for teaching various subjects is minimum 34 (Chhattisgarh) to maximum 54 (Arunachal Pradesh and Haryana).
- The *duration of a period* is minimum 35 minutes to maximum 45 minutes in different states.
- In a majority of twenty-four States/UTs, there is only 1 *recess period* but there are 2 in five states and 3 in four states .Minimum 15 minutes time is allotted in Pondicherry and Goa and maximum 80 minutes in Kerala.
- The nomenclature of *Science* is 'General Science' 'Science', 'Physics, Chemistry and Biology' in different states. The integrated approach for teaching of science is used in 17 States/UTs and disciplinary approach is used in 17 States/UTs.
- Periods allotted are minimum five periods per week to maximum nine periods
- For twelve-monthly examination of science subject, minimum 2.30 hours in seven states and maximum 6.00 hours in most of states are observed. Marks for annual examination range from 100 to 200 in most of the states.
- The nomenclature of *Social Sciences* is 'Social Studies' 'SocialSciences' and 'History, Geography, Civics and Economics' in various States/UTs. The integrated approach is used for teaching of Social Sciences in 14states and disciplinary approach in twenty states.
- The *periods allotted per week* for teaching of social science are minimum 5 and maximum 9.

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- The *time allowed for annual examination* is minimum 2.30 hours and maximum 6 hours
- The maximum *marks allotted ranges* from 100 to 200.
- For *teaching of Mother Tongue*, a minimum 4 periods per week are allotted in Lakshadweep and Mizoram and maximum 9 in West Bengal and Uttar Pradesh. 6 periods are allotted in 20 States/UTs.
- The time allowed for annual examination is 2.0hours to maximum of six hours The marks allotted for examination are 50 to 200.
- For *teaching of English*, minimum five periods per week are allotted in six States/UTs and maximum 10 in Sikkim.
- The *time allowed for annual examination* is minimum 2.0 hours in Jharkhand and maximum 3.0 hours in twenty- seven States/UTs.
- The *marks allotted* for examination are 80 to 200(Pondicherry).
- *Three-language formula* is followed in all the States/UTs except Nagaland, Tamil Nadu, Meghalaya, West Bengal, Mizoram, Tripura and Assam.
- *Periods allotted per week for teaching of Mathematics* is minimum 4 and maximum 9 in many states.
- The time allotted for examination is minimum 2.30 hours in 8 States/UTs and 3.0 hours in remaining 28 States/UTs.
- The marks allotted for examination are 80 in many states to maximum of 200(West Bengal only).
- *Health and Physical Education* is found to be a compulsory subject in most of States/UT sand annual examination is conducted in more than sixty per cent of States/UTs. Period allotted per week varies from 1 to 6 in different states.
- *Art Education* is an essential subject in 16 States/UTs whereas it is optional in 15 States/UTs. The annual examination is conducted in more than 50 per cent States/ UTs. Only one period is allotted for teaching per week in five states and maximum six in Madhya Pradesh, Uttar Pradesh, Haryana and Himachal Pradesh states.
- *Work Education* is named as, 'Socially Useful Productive Work' in 9 States/ UTs, Work Experience in 15 and 'Life Oriented Education' in Tamil Nadu.
- The annual examination is conducted in 13 States/UTs. The periods allotted for teaching per week are from minimum 1 to maximum 5.
- Teaching of *Moral and Value Education* a separate subject in done in many States/UTs. Period per week allotted is ranged from 1-6.
- Annual examination is conducted with maximum 100 marks in Haryana & M.P
- For *evaluation*, both marks and grade are in use.
- The continuous and comprehensive evaluation is followed in seventeen States/ UTs only.
- The curriculum and textbooks developed by NCERT in the reference to NCF-2005 in the 15 States/UTs whereas 14 States/UTs have adapted the NCERT curriculum, syllabus and textbooks. The remaining six States/UTs are in the procedure of revising their curriculum and textbooks.

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CHECK YOUR PROGRESS

10. What are the total working days in a year in primary schools?
11. What is the number of periods per week for upper primary stage?
12. What importance has art been given in secondary level?

7.6 SUMMARY

- Curriculum can be defined as a wide-ranging plan for an educational/training programme/course to offer new/improved manpower to fulfil the rising needs of a vibrant society.
- There is a national organization that plays a key role in developing policies and programmes, called the National Council for Educational Research and Training (NCERT) that prepares a National Curriculum Framework.
- Each state has its counterpart called the State Council for Educational Research and Training (SCERT). These are the bodies that essentially propose educational strategies, curricula, pedagogical schemes and evaluation methodologies to the states' departments of education.
- The NPE 1986 contended that the role of education is essentially to transform a static society into a vibrant one with commitment and development and change.
- The NPE operationally defined concurrence as a meaningful partnership between the Centre and States and placed clear responsibility on the Union Government regarding the national and integrative character of education, quality and standards, manpower planning research and advanced study, culture, human resources development and the international aspects of education.
- An important milestone of the NPE 1986 is its commitment to laying down minimum levels of learning at each stage of education aimed to ensuring the quality of education and comparability across the nation.
- The National Open School was started in India by the Central Board of School Education in 1979. The objective of establishing this School was to provide alternative opportunity through distance education mode to a heterogeneous clientele comprising the rural people, urban poor, women, SC/STs, working adults and school dropouts who are unable to attend the formal school system.
- The Seventh Plan also delineated effective decentralised planning and organization reforms, promotion of non-formal and open learning systems, adoption of low cost alternatives and optimum use of resources as strategies for achievement of the plan objectives.
- The National Council of Educational Research and Training (NCERT) is the top most body that decides the formulation and implication of the curriculum related matters for school education in India.

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- There is a great difference in the psychology of infants, children, adolescents and adults. It is on the basis of their psychology that education is divided into different levels, namely – pre-primary (infant), primary (child), secondary (adolescent) and higher (adult). An even the aims and the curriculum for different levels of education are fixed differently. Secondary education is the education of adolescents; it is a formative education for them and herein lays its need and importance.
- The scope of SCERT pervades the whole school education from pre-primary in secondary to secondary level.
- The National Educational Policy, 1986 announced several programmes for improvement in teacher education, one of which was the setting up of the District Institutes of Education and Training. Under it, the work of setting up of one such institute in each district was undertaken from 1987. By the year 2011, 555 District Institutes of Education and Training have been set up in the country.
- Elementary teachers are trained in Teacher Training Institutes (TTI, they are also known as Junior Basic Training Institutes or Primary Teacher Colleges) attached to State and university departments of education. The course generally lasts for two years and leads to a Diploma in Teacher Education or a Primary Teacher Certificate, P.T.C.
- A textbook or course book is a manual of instruction in any branch of study. The ancient Greeks wrote *texts* intended for education. Early textbooks were used by tutors and teachers, who used the books as an instructional aide.
- Gutenberg was the first European to use movable type printing, in around 1439. Among his many contributions to printing are: the invention of a process for mass-producing movable type; the use of oil-based ink; and the use of a wooden printing press similar to the agricultural screw presses of the period.
- Though we find evidence to the composition of *hymns* and *slokas* of high quality in the early Vedic period but there exists no direct evidence that the art of writing was developed. Certain proofs of the existence of manuscripts, or even only authentic reports on the writing down of texts do not exist.
- The books initially written in the medieval period served the purpose for the *madrasahs* and *maktabs*. The art of printing still did not exist, the books were generally hand written and could not be produced on a large scale.
- The advent of British in India also saw the opening of schools for their children. As printing had already developed in Europe, textbooks were beginning to be published.
- The British administrators were quick to identify the potential in textbooks for spreading knowledge in various disciplines. They also recognized that a textbook and a printing press could be advantageous in spreading some of their ideas and strengthening their political interest in India.
- The British period laid a concrete base for the selection, prescription and improvement of the textbook. The textbook committees were formed during this period. They performed certain functions related to textbook programme such as inviting manuscripts or books, evaluating them, approving or prescribing them and taking steps towards their further improvement.

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- The following concepts became well established. The clientele of the textbook, the mode of printing and the nature of artwork for illustration are also decided. Whether the textbook should be written by a single author, or whether a panel of authors is to be engaged for this purpose.
- A good textbook can help to structure content and provide solid groundwork for further learning. For the inexperienced teacher especially, the textbook may provide information in a well-organized, coherent framework and could well save their precious time that might otherwise be used for research rather than for preparing ways of making the material interesting to students.
- Although there are no such criteria which could be used for evaluating textbooks in the ancient period, the above mentioned principles could well be used as criteria for evaluating the books of those days.
- During the medieval period, textbooks were written generally by the school teachers, the teachers while writing the book considered psychology of the children and day-to-day problems in the classroom.
- After the author has finished the task of preparing a book, now it is ready for the publishing house to take charge. The quality of a good book also depends upon the publishing house to a great extent. A well written and organized book may not serve its purpose unless it is printed properly.
- A book should be well evaluated before its selection. The British regime entrusted the selection of textbooks to its Education Department. There was considerable criticism regarding the quality of the textbooks and the procedure of their selection.
- After World War II, public opinion showed great enthusiasm in the field of International understanding. The UNESCO took up the matter with great zeal.
- NCERT developed detailed criteria for evaluating content in various school textbooks. It has done a commendable job by listing systematically the evaluation criteria that were based on the knowledge and experience of textbook authors, subject specialist, psychologist, educationist and pedagogists.

7.7 KEY TERMS

- **Curriculum:** It can be treated as the essence and or subject matter of educational experiences.
- **Textbook:** A textbook or *course book* is a manual of instruction in any branch of study.
- **Group processing:** Team members set group goals, periodically assess what they are doing well as a team, and identify changes they will make to function more effectively in the future.
- **Jigsaw:** In this activity, small groups consisting of students are created. Each group member is allotted some particular task to learn and then to teach to his group members.

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7.8 ANSWERS TO 'CHECK YOUR PROGRESS'

1. On this basis, curriculum can be defined as a wide-ranging plan for an educational/ training programme/course to offer new/improved manpower to fulfil the rising needs of a vibrant society.
2. The Policy proposed a three-pronged strategy to realize the task of universalization of primary education:
   - Firstly, to provide a motivating school environment through child-centred and activity-based learning process at the primary stage.
   - Secondly, to improve the inputs for teaching-learning process by providing essential facilities in primary schools in terms of classrooms, teachers, and other teaching-learning equipments.
   - Thirdly alternative stream of systematic non-formal programme is to be designed to ensure the coverage of children who dropout from the habitation without schools, working children and girls who cannot attend regular schools to ensure universalization.
3. The National Open School was started in India by the Central Board of School Education in 1979. The objective of establishing this School was to provide alternative opportunity through distance education mode to a heterogeneous clientele comprising the rural people, urban poor, women, SC/STs, working adults and school dropouts who are unable to attend the formal school system. The unique features of these NOS are that it takes education to the doorsteps of motivated learners and does not impose limitations of time and place. Further, it makes provision for studying at one's pace and convenience.
4. India's education system in general is divided into the following levels
   - Pre-primary level
   - Primary level
   - Elementary education
   - Secondary education
   - Undergraduate level
   - Postgraduate level
5. German metal smith Johannes Gutenberg, who introduced printing to Europe.
6. Books were written with the hand on the leaves of the Tala and the Bhojas.
7. The names of Calcutta school book society and the Bombay Native Education Society can be specifically mentioned in this regard.
8. The first was to conserve knowledge, the second to transmit it to the succeeding generations and the third to establish the religion and to stabilize the society.
9. The major principles of developing a textbook during the age of Manu and Panini are: (i) Objective of the book (ii) correctness of the content (iii) completeness of the content (iv) relevance of the content (v) presentation of the content and (vi) style of writing.
10. The total school working days in a year are minimum of 180 in Nagaland and Manipur and maximum of 253 in Bihar and Jharkhand. In more than sixty per cent of the states/ UTs, the working days are between 201 and 220.

UNIT 8 RESEARCH IN CURRICULUM

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Structure

8.0 Introduction
8.1 Unit Objectives
8.2 Concept, Aims and Areas of Curriculum Research
  8.2.1 Approaches used in Curriculum Research
  8.2.2 Types of Curriculum Research Studies
  8.2.3 Stages in the Research Process
  8.2.4 Scientific Enquiry and Research
8.3 Research in Content Analysis
  8.3.1 Ten Steps of Content Analysis
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8.4 Constructivist Approach
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8.5 Summary
8.6 Key Terms
8.7 Answers to 'Check Your Progress'
8.8 Questions and Exercises
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8.0 INTRODUCTION

Ever since formalized education has come into existence, research has been key in enhancing education and also suggests how education functions in different situations. With the help of numerous research methods, educationists aim to seek answers regarding the issues and problems faced by the educational system. Knowledge of curriculum research is an important component of professional preparation for all educators. In order to promote creative and innovative techniques to provide solutions to educational issues and problems, it is essential that an educationist is aware about the different research methods.

In this unit you will learn the areas and aims of curriculum research and the different approaches to research in education.

8.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Discuss the importance of curriculum research
- Describe the different types of research in curriculum
- Explain the constructivist approach to research

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8.2 CONCEPT, AIM AND AREAS OF CURRICULUM RESEARCH

Educationist have broadly defined as appliance of those systematic methods and techniques that aid the researchers and others who practice it in understanding and improving teaching and learning procedure. Like in any other field of research, education also has two ways or mode of educational research.

1. Inductive Reasoning

Inductive reasoning is generally referred as a 'bottom-up' approach of knowing. In this type of approach, researchers use individual observation to build an abstraction or to portray a picture of the happening that is under study.

The conclusions derived from generalities and from statements of presupposed authorities by deductive reasoning are true only if they are based upon true premises. To find out whether the premises are true, Francis Bacon stressed the need for basing general conclusions upon specific facts gathered through direct observations. This is what is known as inductive reasoning— going from the particular to the general. Rather than accepting premises laid down by authorities as absolute truths, Bacon advised man to observe nature closely, to experiment, tabulate all the facts, to study these facts in order to reach minor generalizations, and then to proceed from minor generalizations to greater ones. He, however, cautioned against formulating any hypothesis or any probable solution to a problem until all the facts had been gathered.

Inductive reasoning generally leads to inductive methods of data compilation where the researcher performs the following functions:

- Systematic observation of the phenomena that is being investigated
- Tries to find new patterns or themes during observation
- Establishes a generalization from the analysis of the of the themes

So the researcher proceeds from specific observations to general statements. This type of research can be called a type of discovery approach to knowing.

2. Deductive Reasoning

In comparison to inductive reasoning, deductive reason uses a top-down approach to knowing.

A noteworthy contribution towards the development of a systematic technique for obtaining reliable knowledge was made by the ancient Greek philosophers like Aristotle and his followers. Aristotle developed the syllogism, which can be described as a thinking process in which one moves from general to specific statements by deductive reasoning. It provides a means of testing the validity of any given conclusion or idea by proceeding from the known to unknown. The syllogistic reasoning consists of:

- A major premise based on a self-evident truth or previously established fact or relationship.
- A minor premise concerning a particular case to which the truth, facto, or relationship invariably applies.
- A conclusion if the major and minor premises can be shown to be true, the conclusion arrived at is necessarily true.

This can be illustrated through a simple example as given below:

All animals are mortal;

Dog is an animal;

Therefore, dog will die.

The conclusion of a syllogism is always derived from the content of premises. Therefore, if the premises are unrelated or if one of the premises is erroneous, the conclusion arrived at will not be valid.

Another serious restriction of the deductive reasoning is its dependence upon verbal symbolism.

Deductive reasoning can systematize what is already known and can identify new relationships as one proceeds from known to unknown, but it cannot be relied upon as a self-sufficient method for securing reliable knowledge.

This type of research is also referred as Hypothetic Deductive method, which originates by formulating a hypothesis which means a tentative explanation that can be tested by collecting data.

For example, one hypothesis can be generated as small classes that would probably result in a better amount of student learning as compared to that of large classes. This hypothesis would have its foundation based on a theory or a knowledge base composed of the results of previous research studies.

A powerfully built explanation of how some aspects of the world functions using a structure of concepts, principles, and other hypotheses is known as Theory. For example, a humanistic theory of education is a theory which may lay stress upon a healthy and well built relationship between teacher-student as part of effective learning.

Prior research studies have proved that relationships of this type are more evident in small classes. Thus, on the basis of recent studies and the humanistic theory, the researcher in our example may suggest that small class sizes will lead to improved student learning. The next step of hypothetic deductive approach involves the compiling of data, where the researcher might make a comparative analysis of student learning in a batch of 15 or fewer students with a batch of 25 or more students. If the students who are a part of the smaller batch show an increased amount of learning, the hypothesis will be validated. However, if the learning—as by deductive reason— the hypothesis is false. The following points summarize the researcher's method:

(i) The researcher begins with a theory and knowledge base and uses them to formal hypothesis.

(ii) The researcher gathers data

(iii) The researcher makes a decision based on the available data. He may either accept the hypothesis or reject it.

The two approaches to knowing i.e. inductive and hypothetic-deductive signify two general means to acquire knowledge that is used in curriculum research. Inductive

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reasoning is most intimately connected with the approaches to research that are qualitative in nature. The collection and summarising of data is generally done using primarily narrative or verbal methods: observations, interviews, and documents analysis. Qualitative researchers are often said to take inductive approaches to data collection because they formulate hypotheses only after they begin to make observation interview people, and analyse documents. The hypotheses thus formed are thoroughly examined and adapted by additional data collection rather than accepting or rejecting it out rightly. The qualitative researchers consider that complete understanding of any phenomena is dependent relative on the context, and so only after data collection they use theories primarily to help them understand the patterns that are observed. Still, eventually qualitative researchers make an attempt to make claims about the truth on the basis of hypotheses.

The hypothetic-deductive method has its close connection with the quantitative approaches, which sum up data by means of numbers. Hypotheses and methods of data collection in quantitative research are created before the research begins. Next step that is followed is that of testing of hypotheses or theories. These hypotheses or theories are characteristically well thought-out to be capable of being generalisable i.e. it is appropriate for a wide range of similar situations and populations. Quantitative researchers may also use inductive reasoning as they gaze for parallel experiences and results from novel ideas, concepts or theories.

The exclusive use of Bacon's inductive method resulted in the accumulation of isolated bits of information, and therefore, it made little contribution to the advancement of human knowledge. Moreover, many problems could not be solved by inductive reasoning alone. In view of these limitations, it was superseded by the inductive-deductive method or the scientific method. This method, attributed to Charles Darwin, integrates the most important aspects of the inductive and deductive methods. The scientific method, therefore, is a back-and-forth movement of thought in which man first operates inductively from partially known or sometimes confused information learned from experience, previous knowledge, reflective thinking, observation and so on, towards a meaningful whole or hypothesis, and then deductively from suggested whole or hypothesis to the particular parts in order to connect these with one another in a meaningful pattern to find valid relationships.

Although, in practice, scientific method involves a double movement of reasoning from induction to deduction, in its simplest form, it consists of working inductively from observations to hypotheses and then deductively from the hypotheses to the logical implications of the hypotheses in relation to what is already known.

Theoretical frameworks for curriculum research

Currently curriculum research has begun to move away from a rigid and rapid distinction amid qualitative and quantitative research methods. Nowadays researches can have its basis of classification based on philosophical frameworks as follows:

- Identified in stipulations of the assumptions they make about the nature of the reality studies.
- Claims about what we can and cannot know, and the ways in which they utilise theories and findings.

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- Each framework also makes assumptions about whether qualitative or quantitative methods are most appropriate for extending our knowledge about education.

For a beginner in the field of research it is important that he/she should take into consideration the approach that fits best into the assumptions about how the world works.

Scientific Realism

Scientific realism is an expression referred to the frame used by the majority of researchers who take up wholly quantitative approach to research. This type of research is characterized by a craving to answer research questions by producing numerical data that represent various constructs and variables.

A construct is a hypothetical concept that is characteristically developed from an academic framework. Even though constructs are names for things that cannot seek (e.g., intelligence, motivation, self-esteem), they are supposed to be factual description that influence educational outcomes. When we measure constructs in curriculum research, they are known as variables. Like the constructs they represent, variables are made distinct as attributes, qualities, and characteristics of persons, groups, settings, or institutions, such as gender, societal skills, socioeconomic status, refinement, or achievement. Scientific realists strive to establish cause and effect relationships where possible, using data collection methods, such as questionnaires, tests, and observational checklists to produce quantitative data.

The rational underpinnings of the scientific realism approach can be originated in the positivist opinion developed principally to explain information generation in the physical sciences. The first assumption made by scientific realists is that there is existence of a real social and psychological world that can be precisely captured all the way through research. In simple words it can be said that there is an objective reality that research aims to describe. Scientific realists additionally presuppose that the social and psychological world can be studied in to a large extent the same way as the natural world by breaking compound phenomena and problems into smaller parts. The chief job of the researcher is to recognize the most important parts or variables and precisely illustrate how these are associated to each other in the real world.

Scientific realists consider knowledge as hypothetical and believe that it is therefore subjective to feasible amendment. Testing of all hypotheses is done using statistical tests that sets up the point of confidence that one can have in the results that are obtained. Scientific realists are well aware of the fact that because one of the main aims of education is to study human behaviours and characteristics, they fear the fact that research may be influenced by the investigator. For an investigator to uphold apparent neutrality, he or she must play a disconnected job, where there is little chance for communication with the participants under study. Scientific realists believe strives to eliminate any personal bias can reliably determine findings. Although they borrow rigorous scientific techniques from the natural sciences, the scientific experiments are not always possible. Scientific realists concede that different persons might have different perceptions of reality; however, they assume that experiences overlap to a large degree and that a good researcher can take these different perceptions into account in providing the best possible explanation of reality.

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Social Constructivism

Traditionally pure quantitative research is often done by a person who holds a framework referred to as interpretive, constructive or naturalist. Social Constructivists challenges the scientific realist assumption that reality can be reduced to its component parts. Instead they give the argument that the phenomena should be understood as complex 'wholes' that are inextricably bound up with the historical, socioeconomic and cultural context in which they are rooted. Therefore, the social constructivist tries to understand the phenomena from a context- specific perspective. Social constructivist views scientific inquiry as value based and not value-free.

Pragmatism

This is the framework most developed by the American Philosophers. Unlike the other frameworks, pragmatists are not concerned with whether research is describing either a real or socially constructed world. Instead Pragmatists consider that the research simply helps to identify what works in practical sense. They are likely to reply that knowledge arises from examining problems and determining what works in a particular situation or condition.

8.2.1 Approaches used in Curriculum Research

The scientific approaches used in curriculum research can be classified into:

- The extent to which the findings are applicable to the educational settings (e.g., Basic vs. applied Research)
- The methods used to design the study and to collect data (e.g., Qualitative vs. Quantitative Research)
- How the information is shared (e.g., the dissemination of the findings)

8.2.2 Types of Curriculum Research Studies

There are number of ways in which Curriculum Research Studies can be classified. According to the kinds of information provided they are classified as:

- *Historical research*: Generates descriptions, sometimes attempt explanations of conditions, situations and events that have occurred in the past.
- *Descriptive research:* Provides information about the conditions, situations and events that have occurred in the present.
- *Co-relational research:* involves the search for relationship between variables through the use of various measures of statistical associations.
- *Causal research:* This kind of research aims to propose underlying linkages between variables by observing the current phenomena and then probing back through available data in order to attempt to identify probable causal connection.
- *Experimental research:* Provides for much control and therefore, establishes a systematic and logical association between manipulated factors and observed effects. The researcher defines a problem and proposes a tentative answer to it also called hypothesis. The researcher then tests this presupposed hypothesis and accepts or rejects it in the light of the controlled variable relationship that he/she has observed.

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- *Case study research:* Usually refers to two separate research approaches. First kind of case study is an intensive investigation of a social unit like a particular classroom, school, family, a group of delinquents and students with the intention of analysis of the factors and their interrelationship which help the researcher to construct a comprehensive picture of the unit.

  The second approach is associated with the applying of the quantitative research methods to non-probability samples which give us result that are not necessarily intended to be generalised to the wider populations
- *Ethnographic research:* Describes the kind of events that happen in the life of a cluster with scrupulous mention of the interaction of the individuals in the perspective of the socio-cultural norms, rituals and viewpoint shared by the group.
- *Research and Development research:* This kind of research differs from the above types of research in the sense that instead of bringing new information or knowledge into light it focuses on the interface between research and the construction and assessment of a new product. This type of research can be formative.

8.2.3 Stages in the Research Process

General and Specific Research Questions: In this process, general questions are asked for e.g., 'All other conditions being equal do the students with one kind of textbook accomplish better than those students with Textbook of another kind?' In order to precede the research in a more focused and systematic manner such kind of questions must be developed to form more precise research questions that specify the target population in which variable or factors should be incorporated in the research study.

Literature Review: This stage besides allowing the researcher to acquaint with the current knowledge in the field or area in which the researcher is going to conduct research serves the purpose to define the limits of his/her field. It also helps the researcher to update on the work that others have done and to avoid the unintentional duplication of the well established findings An effective research literature review is not just a synopsis of research studies and their findings rather it represents an embodiment of the indispensable issues inter-relationship associated with the knowledge, arguments and themes that have already been explored in that area.

Research Design: After the precise research question has been posed, a judgment must be taken on which research design must be adopted like whether to adopt experimental or survey method. If the choice stands for the Survey method then further decision has to be taken regarding the choice of type of Survey design i.e. longitudinal design in which data is collected at diverse points or cross-sectional design in which data is collected at a single point of time.

Instrumentation: We can make out from the specific research questions established in the first step of a research study the type of indicators and variables required in the research. It is possible to determine the general characteristics of questionnaire and/or test items, etc. that are required to form these. Decisions must then be taken on the medium by which data has to be collected.

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After all the decisions in relation to the research have been taken the construction of the instrument begins. This normally comprises of the writing of test items, attitude items, and questionnaire items. The items should be reviewed by able-bodied experts in order to make sure that they are clear-cut, and they facilitate in drawing out the requisite information.

Pilot Testing: In the stage of pilot testing the instruments decided and constructed for the purpose are administered to those individuals who are bonafide for the conduction of research and will respond in the final data collection.

For example, the target population may be the school principals and or teachers or students in a small number of schools. If the target population has been specified as, for example, Grade 5 in primary school, knowledge should exist in the Ministry, or in the inspectorate, about the schools that are good, average, and poor in terms of curriculum achievement levels or in general conditions of school buildings and facilities. A 'judgement sample' of five or eight schools can then be drawn in order to represent a range of achievement levels and school conditions. It is in these schools that the pilot testing should be undertaken.

The two main purposes of most pilot studies are:

- To assess whether a questionnaire has been designed in a manner that will elicit the required information from the respondents. This process allows weaknesses in the questionnaire to be detected so that they can be removed before the final form is prepared.
  Typical weaknesses that are found in questionnaires include:
  - o Ambiguities in the construction of questions
  - o Unnecessary complexity in the language that has been used
  - o Unsuitable response categories for some questions
  - o Redundant questions
- To assess whether test items can be understood by the students, that the items are pitched at the appropriate level of complexity, provide a stable measure of student ability, and it guides to the production of total test scores that are significant in terms of the student ability being examined.

Assessment of the effectiveness of the data collection procedures is also very important.

Data Collection: After the selection of the probability sample and the instruments, the next assignment is to arrange the logistics of the data collection. Data collection is essentially an important part of the research processes that the inferences, hypotheses or generalizations tentatively held may be identified as valid, verified as correct, or rejected as untenable. In order to collect the requisite data for any research problem, the researcher has to sample the population concerned as it is not possible to encompass the entire population. Devise appropriate tools for measuring the attributes concerned and administer these tools.

The managing of this investigation stage will rely on the existing infrastructure for data collection. It is also important for the curriculum planners to take control of the selection of the student to be tested.

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After the data has been entered, cleaned, and amalgamated, the step which often requires the students, teacher, and school files of a particular school to be attached into one record after which the next step can begin i.e. data analysis can begin.

Data Analysis: Analysis of data means studying the organized material in order to discover the inherent facts. The data is studied from as many angles as possible to explore the new facts. Analysis requires an alert, flexible and an open mind. It is worthwhile to prepare a plan for analysis before the actual collection of data. Four helpful modes to get started on analysing the gathered data are:

1. To think in the terms of the significant tables that the data permit
2. To exam in carefully the statement of the problem and the earlier analysis and to study the original records of the data.
3. To get away from the data and to think about the problem in lay-man's terms or to actually discuss the problems with the others.
4. To attack the data by making various statistical calculations.

Descriptive: Characteristically, the first step in the data analysis is to produce descriptive statistics independently for each variable. These statistics are often called invariants.

Correlation: In this step of data analysis the correlation techniques of the type, product, moment, correlations or cross tabulations can be calculated. There are various statistical tests which can help to determine whether the association that is reflected is more than what could occur by chance. When the association between two variables is examined, this is known as 'bivariate' analysis.

Casual: If we apply experimental design, then tests can be applied to observe if the performance of the experimental group is better than the control group. However, there are various statistical techniques for determining this. This approach's use depends on the application of randomization in order to ensure that the two groups are 'equivalent' in all other respects.

Research Report: There are three major types of research reports. The first is the Technical report written in great detail and showing all the research details. This typically is read by other researchers. It is this report that provides evidence that the research was conducted soundly. It is usually the report which is written first. The second report is for the senior policy makers in the ministry of education. It is in the form of an Executive Summary of about 5 or 6 pages. It reports the major finding succinctly and explains, in simple terms, the implications of the findings for future action and/ or policy. The third General Report is usually in the form of a 50 to 100 page booklet and is written for interested members of the public, teachers, and university people. This report presents the results in an easily understood and digestible form.

8.2.4 Scientific Enquiry and Research

Science and technology is of great significance to mankind. The changes brought forth by science and technology take place at an accelerated pace. These scientific and technological advances have enhanced human life to a great extent but at the same time have raised serious ethical, legal and social questions. If society wants to reap the benefits

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of these changes, it needs to minimize the negative effects that come with it. It is very essential that people have the ability to make informed, objective decisions with regards to the application of science and technology. This can only be possible if the public is educated about scientific enquiry and research and its relevance in curriculum development.

The objectives of scientific enquiry and research in curriculum are as follows:

(i) Students are able to understand the basic aspects of scientific enquiry. Science proceeds by a continuous, incremental process that involves generating hypotheses, collecting evidence, testing hypotheses, and reaching evidence-based conclusions. Scientific enquiry on the other hand is flexible and is not limited to involving one particular method. One particular question may have several types of investigation methods and there may be a possibility of having more than one answer. Usually student figure science to be a subject of experimentation. However, science also uses different techniques like observations, surveys and non-experimental approaches.

(ii) Scientific enquiry and research also give students a chance to enhance their reasoning and critical-thinking skills. These skills are not just relevant for scientific research but for making decisions in daily life. Due to these constant changes taking place, it is very important that today's youth be lifelong learners. They should be able to evaluate information from a number of sources to understand its usefulness. A student should be able to establish causal relationships and be able to differentiate them from mere associations.

(iii) Students should be able to identify the purpose of scientific research. Ongoing research affects how we understand the world around us and provides a foundation for improving our choices about personal health and the health of our community.

What's in it for the Teacher?

The process of scientific enquiry and research meets many of the criteria by which teachers and their programmes are assessed. This evaluates the standards that are described, i.e., what students should know and be able to do with respect to scientific enquiry. In addition, scientific enquiry and research provides a means for professional development. Teachers can now engage in new and different teaching practices such as those described in this module without completely overhauling their entire programme. In *Designing Professional Development for Teachers of Science and Mathematics*, **Loucks-Horsely et al**. write that supplements such as this one 'offer a window through which teachers get a glimpse of what new teaching strategies look like in action.' By experiencing a short-term unit, teachers can 'change how they think about teaching and embrace new approaches that stimulate students to problem-solve, reason, investigate, and construct their own meaning for the content.' The use of this kind of supplemental unit can encourage reflection and discussion and stimulate teachers to improve their practices by focusing on student learning through enquiry.

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CHECK YOUR PROGRESS

1. What is inductive reasoning?
2. What does syllogistic reasoning consists of?
3. What do you understand by scientific realism?
4. Fill in the blanks.
   (a) _____aims to propose underlying linkages between variables by observing the current phenomena and then probing back through available data in order to attempt to identify probable causal connection.
   (b) In _____ process, general questions are asked.
   (c) After the selection of the probability sample and the instruments, the next assignment is to arrange the logistics of the_____.

8.3 RESEARCH IN CONTENT ANALYSIS

In 1931, Alfred R. Lindesmith developed a methodology to disprove the existing hypotheses, which came to be known as Content Analysis technique. It gained recognition and fame in the 1960s, when Glaser referred to it as 'The Constant Comparative Method of Qualitative Analysis'. Glaser and Strauss afterwards modified it to invent a new concept of Grounded Theory.

Content analysis or textual analysis is a method adopted in the social sciences for studying the content of communication. Some of its prominent definitions are:

Earl Babbie – 'The study of recorded human communications, such as books, websites, paintings and laws.'

Dr. Farooq Joubish – 'Content analysis is considered a scholarly methodology in the humanities by which texts are studied as to authorship, authenticity, or meaning.'

Harold Lasswell– 'Formulated the centre questions related to content analysis i.e. who says what, to whom, why, to what extent and with what effect?'

Ole Holsti– 'Offers a broad definition of content analysis as any technique for making inferences by objectively and systematically identifying specified characteristics of messages.'

Thus content analysis is a summarizing, quantitative analysis of messages that relies on the scientific method (counting as well as the attention to objectivity, inter-subjectivity, priori design, reliability, validity, generalisability, replicability, and hypothesis testing) and is not limited to the types of variables that may be measured or the context in which the messages are created or presented.

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8.3.1 Ten Steps of Content Analysis

The ten step of content analysis are:

1. Copying and reading through the transcript. Brief notes in the margin have to be made when interesting or relevant information is found.
2. Go through the notes prepared in the margins and register the diverse types of information set up.
3. After going through the list one should categorise each item in a way that offers an explanation of what the list is about.
4. Identify whether or not the categories can be linked any way and list them as major categories (or themes) and/or minor categories (or themes).
5. Compare and contrast the various major and minor categories.
6. If there is more than one transcript, repeat the first five stages again for each transcript.
7. When you have done the above with all of the transcripts, collect all the categories or themes and examine each in detail and consider if it fits and its relevance.
8. Once all the transcript data is categorised into minor and major categories/ themes, review in order to ensure that the information is categorised as it should be.
9. Review all of the categories and ascertain whether some categories can be merged or if some need to be sub-categorised
10. Return to the original transcripts and ensure that all the information that needs to be categorised has been so.

The process of content analysis is lengthy and may require the researcher to go over and over the data to ensure they have done a thorough job of analysis

8.3.2 Curriculum Research Framework

Separating curriculum development and educational research destroys its legal validity; the two remain distinctive. The objective of scientific research is to create new kind of knowledge whereas the aim of curriculum development is the creation of instructional resources. This distinction between the curriculum research and educational research may be one of the reasons that curriculum development does not reliably improve.

Curriculum development can be referred to be as a design science having two goals. First the goal of building a learning process and second the budding local theories. As a science, knowledge created during curriculum should have its developmental base both at generation and placement level within a scientific research corpus, has to be peer reviewed, and published. The self-regulating norms of a scientific community over time are the means of achieving scientific advances. The goal cannot be to develop a single ideal curriculum but rather dynamic problem solving, progress, and advancement beyond present limits of competence.

In curriculum framework it is important that the curricula are created after a thorough research. Research is socio-political in nature and therefore includes socio-historical movements, values, controversies, politics, competition status hierarchies and

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egotism. Curriculum research is influenced by these factors, so therefore checks and balances of scientific research are significant to support full exposure as well as progress.

It is also important that curriculum research is not limited to research-to-practice strategies. The goals and strategies are absorbed in the proposed framework. Since they comprise one way translations of research results, the model restricted to research-to-practice strategies is imperfect with respect to its presumptions, insensitive to changing goals in the content area, and unable to contribute to a revision of the theory and knowledge. Hence, a valid scientific curriculum development programme should fulfill two basic issues, i.e., effect and conditions in three domains—practice, policy and theory. In order to attain these goals scientifically, developers must fulfill the following:

- Draw from existing research so previously-acquired knowledge can be applied to the curriculum.
- Structure and revise the curriculum content in a method that is feasible to children's thinking and learning in a domain.
- Add evaluations through the formative and summative approach in a series of progressively expanding social contexts.

It is not easy to evaluate the relation between curricula and research as many developers claim that the curricula prepared by them is based on research however they do not validate their claims. In the absence of an established framework to evaluate these claims, the concerned officials use other criteria to develop and select curricula, and the potential for curriculum development and evaluation to build a coherent scientific knowledge base is unrealized.

The Curricular Research Framework includes several phases of the curriculum development research.

- ***Identifying the subject matter:*** Building of educational goals involves numerous considerations that go beyond science. The main objective of the research phase is to identify the content which is in line with the discipline and it proves to be substantial to the development of students. This means that the concepts and process of the domain should be key in subject matter domain and incorporate from students' past experiences and ensure future development of students. Research should also involve the harmonizing of competency components like problem solving, metacognition and a positive disposition towards learning and availing the subject-matter content.
- ***Establishing General Goals:*** Review of various theories, philosophy discussion and empirical results on teaching and general curriculum issues. For instance, the developers may initially begin from an Ausubelian or constructivist point of view and proceed in direction. Also, research and curriculum theory provide a perspective on students' and teachers' experience with the curricula as well as on school and society that will eventually help in establishing general goals and directions.
- ***Making of Pedagogical Strategies:*** Empirical finding on making specific types of activities educationally effective, motivating and efficacious are reviewed to create general guidelines for the generation of activities. Pedagogical strategies and curriculum structure are not determined fully by this line of reasoning, or course, intituion, and the art of teaching play roles. A science only lays down lines within which the rules of the art must fall, laws which the follower of the art must not transgress.

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- ***Structuring Research on the basis of learning models:*** Performances are planned in accordance with field specific models of learning. This might involve two interrelated aspects.
  1. First activities may be designed to be dependable with empirically-based models of children's thinking and learning in the targeted subject-matter domain, which can considerably affect curriculum design by focusing it on teaching and learning. As an example, based on research that indicates that young children has the capability of their own solutions to simple arithmetic problems and yield from doing so more than from being taught authoritarian procedures, such curricula have been crafted that present problems in the forms of activities and games and ask children to shape out how to solve the problems and explain their solution strategies, often with the help of scaffolding techniques to direct their inventions.
  2. Second sets of activities may be sequenced according to learning trajectories through the concepts and skills. This strategy helps learning to be more effective and efficient and can help avoid the breakups that are common in textbooks, in which the numbers of short strands are up to ten times the possible number of topics.

The complete learning course includes an explication of the mental constructions and patterns of thinking that constitute children's thinking at each level, how they are integrated in each succeeding level, and task allied to each level. Such clarification allows the researcher to test the theory by testing the curriculum, usually with teaching and design experiments.

Market Research

Market research is consumer-oriented research related to the needs and requirements of the customer. It is perhaps the most widespread type of research in commercial curriculum development. On considering market research as usually conducted, this as a rule involves a close look at state standards, guidelines, and curricula, and standardised tests. A publisher usually creates sample material that is then distributed to pre-decided focus groups in a particular geographical location. To keep the identity of the publisher hidden, these focus groups are conducted by a separate facility. A general questionnaire is used by the facility officials. This questionnaire centres on the curriculum. With the help of interviews, a large number of teachers and administrators are also surveyed. These interviews help to provide general information about desired topics, assessment and various other features related to the curriculum. These strategies along with sales force meetings of the company help participants to describe what customers are requesting for.

In India, research which does not include the concerns of publishers, teachers and marketability will not achieve wide adoption. Developers need to form early and sustained relations with publishers to conduct scientific market research so that the needs of research and marketability can be met. This would include inquiry that is completely aware of the students' experiences, is conducted in public view and is consciously documented. This would connect the scientific curriculum research with the different types of information that publishers are more familiar with, thus reducing the gap between developers and publishers, which is a common occurrence for innovative materials.

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Formative Research

Pilot testing with individuals or small groups of students is conducted on workings or on parts of the curriculum. Early interpretive work evaluates components using a blend of model (or hypothesis) testing and model generation strategies, including design experiments, as well as grounded theory, microgenetic, microethnographic, and phenomenological approaches.

The goal is to comprehend the sense that students give to the curriculum objects and tasks. Evaluating sections of the curriculum focuses on consonance between the actions of the students and the learning model or trajectory. If there are differences found, either the model, or the way in which this model is instantiated in the curriculum should be transformed.

Using the cognitive model and learning trajectories as guides, and the task as catalysts, the developer creates more sophisticated models of the thinking of particular groups of students at the same time, the developer describes what basics of the teaching and learning environment, such as specific scaffolding strategies are observed as model may involve is symmetry, modelling, communal processes, training, and combinations of these and many other processes.

The main aim is to join these processes with explicit ecological description and teaching strategies and student learning, and thus describes knowledge and abilities that are expected of the teacher. As in all phases, fairness must be considered.

As there are research and development processes happening, and with so many possibilities, widespread documentation of it is necessarily required. Documentation allows researchers to communicate finding to particular mechanism and character of the curriculum. Field notes, and often audiotapes and videotapes, are attached together. Computers can also be used as a medium to store data documenting students' ongoing activity. Solution-path recording is chiefly a useful modus operandi. Solution paths can be re-executed and examined by the teacher, student, or researcher; and even there is a chance of their modification.

Single classroom

Teachers are ideally supposed to be involved in all phases (in many projects, teachers are a central component of the research-and-development team). A special weightage here is the process of curricular performance. For example, a goal of the curriculum may be to help teachers interpret student's thinking about the task and the content they are intended to teach; help the teachers 'learning of that content, particularly any topics that are new to teachers; and provide guidance regarding the external representations of content that the materials use.

Thus there are two research thrusts.

- First, classroom-based teaching experiments are used to track and evaluate student learning, with the goal of making sense of the curricular activities as they are experienced by individual students. Extensive field notes and often videotapes are required so that students' performances can be examined repeatedly for evidence of their inter presentations and learning, for reasons similar to that of the previous phase.

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- Second and simultaneously, the entire class is observed for information concerning the usability and effectiveness of the curricula, as well as for its character. Ethnographic participant observation is used heavily to examine the teacher and students as they construct new types of classroom cultures and interactions together. This is critical, because events and properties emerge in such interactions that cannot be predicted or understood solely in terms of analyses of their components, but must be understood as a complex system. Thus, the focus is on how the materials are used, how the teacher guides students through the activities, what characteristics emerge in various instantiations of the curriculum. And, generally, how these processes are connected to both intended and unintended student outcomes. This phase may involve teachers working closely with the developers.

Multiple classrooms

Several classrooms are observed for information about the effectiveness and usability of the curriculum, with an emphasis on the usability and decision-making by such teachers and the conditions under which the curriculum is more or less effective, and how it might be altered or complemented to better serve the latter conditions. Innovative materials often provide less support for teachers than the traditional materials with which they are familiar, so such ecological research is especially important for reform curricula.

Summative Research

Small Scale

In this stage, researchers assess what can really be achieved with archetypal teachers under realistic circumstances. Again in multiple classrooms, pre- and post-test randomised experimental designs using measures of learning are used. The main issues in this phase are:

- First, standardised instruments must have been chosen or developed as valid measures of the curriculum goals.
- Second, the plan requires that the intervention is fully and explicitly described and able to be implemented with fidelity.
- Third, in a similar stratum, the curriculum used in the comparison classrooms also should be fully and openly described, and preferably selected on a righteous basis.
- Fourth, the quantity and quality of instruction must be measured in all participating classrooms (e.g. via classroom observation instrument that measures components such as the classroom culture, including the environment and the personal attributes of the teacher, and specific lessons, including focus, organisation and teaching approaches, teaching and learning interactions, assessment and instructional adjustment.
- Sixth and finally, if quasi-experiment designs only are possible, careful consideration of bias must be conducted to ensure comparability. Experiments are conducted in conjunction with, and to implement methodologies previously described.

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Surveys of teacher participants also may be used to compare data collected before and after they have used the curriculum, as well as to collect such data teacher's background, professional development, and resources. The combined interpretive and survey data also address whether supports are viewed as helpful by teachers and other caretaker sand whether their teaching practices have been influenced.

A theoretical framework is essential; comparison of scores outside of such a framework, permitted in traditional curriculum evaluation, is inadequate. A related point is that the comparison curriculum must be selected deliberately, to focus on specific research issues. Further, connecting the curriculum objects and activities and the processes of curricular enactment, including all components of the implementation, to the outcomes is important for theoretical, development, and practical reasons. Also connected to outcomes are variables from the broader data collected. Similar connections should be made across experimental and comparison classrooms. Without such connections, there is an inadequate basis for contributing to theories of learning and teaching in complex settings, guiding future curriculum development, and implementing the curriculum in various contexts. Finally, statistical analyses performed on the appropriate units of analysis, often the classroom or school, should aHow making those connections and provide estimates.

Large Scale

Commonly known is the 'deep, systemic incapacity of schools, and the practitioners who work in them, to develop, incorporate, and extend new ideas about teaching and learning in anything but a small fraction of schools and classrooms.' Thus with any curriculum, but especially one that differs from tradition, evaluations must be conducted on a large scale. Such research should use a broad set of instruments to assess the impact of the implementation on participating children, teachers, program administrators, and the parents as, well as document the fidelity of the implementation and effects of the curriculum across diverse contexts.

A related goal is to measure and analyse the critical variables, including contextual variables e.g., setting such as urban/suburban/rural; type of program; class size; teacher characteristics; student/family characteristics) and implementation variables (e.g., engagement in professional development opportunities; fidelity of implementation; leadership, such as principal leadership, as well as support and availability of resources, funds and time; peer relations at the school; 'convergent perspectives' of the developers, school administrators; and teachers in a cohort; and incentives used.

Two criteria need to be fulfilled for a summative evaluation to be complete, which are as follows:

- Curriculum needs to be evaluated at different sites for a time period that may extend more than two years. During evaluation, the complete documentation of the contextual and implementation variables including practical requirements, procedures and costs should be done.
- Researchers, who are not related to developers of the curriculum, need to confirm evaluations giving specific attention to adoption and diffusion issues of the curriculum.

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The large expense and effort involved in meeting these criteria is another reason that previous evaluation phases should be employed first; only effective curricula should be scaled up. A final approach is non-scientific and often contrived, but may be frequent in practice, and thus is mentioned for completeness. It is not a component of the Curriculum Research Framework.

Once the curriculum has been created, the results which are consistent with the curriculum are consequently stated. Thus, such justifications would include accurate descriptions of different phases or foundations that were consistently used in curriculum creation, however were never documented. Therefore, these justifications can be defined as the documentation of descriptions that were previously not recorded. In order to complete a proper research process, all phases of the curriculum need to be recorded and shared with the concerned people.

Source: http://gse.buffalo.edu/org/buildingblocks/writings/Curriculum_Research.pdf

8.4 CONSTRUCTIVIST APPROACH

Constructivism - A learning theory

According to the Constructive approach 'Learning is an active process and Knowledge is constructed from (and shaped by) experience, It states further that learning is a personal interpretation of the world. In simple words it can said that fundamentally, constructivism implies that people construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences.

Constructivism is a process in which the instructor/teacher has to:

- Customise curriculum to address students' suppositions
- Help negotiate goals and objectives with learners
- Pose problems of emerging relevance to students
- Emphasize handson, realworld experiences
- Seek and value students' points of view
- Social context of content should be taken into consideration

Constructivism is a process in which the student is:

- Member of community of learners
- Collaborate among fellow students
- Learn in a social experience i.e. appreciate different perspectives
- Take ownership and voice in learning process

Curriculum developers approach towards their task of developing curriculum comes from an adult perspective. They use adult logic to set objectives, identify skills, define task, and measure success. To be effectual, teaching must be guided by the logic of children at diverse stages of development. Adults must value and seek to be aware of the child's point of view, which reflects his/her cognitive structures at a given point of time.

Piaget has been the major figure in promulgating the constructivist perspective. Nevertheless, Piaget viewed constructivism not as a theory of learning, but as a theory of development. He stated that human beings develop through predictable and convectional stages, each of which is typified by the emergence of new cognitive structures

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that increase the complexity of our thinking. He concluded that learning cannot account for development, but vice-versa i.e. development accounts for learning. 'Teaching children those concepts that they have not attained in their unplanned development is completely hopeless.'

Constructivism can be defined as a psychologically based notion of development we come to know our world by interacting with it and using our operative cognitive structure to 'explain' what we have perceived. Constructivism is also a model of learning since construction of knowledge is often accompanied by the emergence of new cognitive structures. Eventually our second graders will recognize that the pie is the whole and each slice cannot also be the whole, at this point they will have gained a different, more complex, understanding of part/whole relationships.

8.4.1 Curriculum from a Constructivist Perspective

In the process of budding curriculum, teachers are trained how to weigh up the cognitive abilities of their students and the cognitive demands of the concepts they teach, and how to create an enhanced, or more developmentally appropriate, match between the student and the curriculum.

There exists a fine, increasingly indistinguishable line between curriculum development and curriculum implementation or instruction. Many State Education Departments have developed syllabuses for almost all curriculum areas, mandating or guiding what is to be taught and giving permission only for local discretion in how to teach it.

The Role of the Teacher

Curriculum development and delivery from a constructivist perspective is a highly compound, idiosyncratic attempt or unlike competency based teaching models, in which teacher reflection is often secondary to written curriculum, the success of constructivist approaches to curriculum development and delivery is contingent on the thoughtful mediation of the teacher. Although written curriculums are valued as general guides denoting what students should learn, the cognitive abilities of students often for teachers to shift direction. This requires teachers to think on their feet and reflect on their practice. Competency based models view teachers largely as implementers of curriculum developed elsewhere in the local, state, or national hierarchy. Constructivist models view teachers as developers and deliverers of curriculum. If students are not constructing knowledge as anticipated by the teacher, the teacher must quickly analyse the reasons and alter the curriculum or develop a new curriculum.

This is not a revolutionary notion Good teachers have always been able to read the class, shift gears, and adapt. Constructivism gives teachers another lens through which to read the class, an important one that has been largely ignored in our endless search for sample answers to complex problems. Models that attempt to be teacher proof miss an essential point that we are all constructors, students and teacher alike. Effective teachers are constantly constructing knowledge about the abilities of their students. They resist being tied to fixed, static curriculum sequences and seek opportunities to develop curriculum consistent with their expanding knowledge of students.

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Constructivism, however, explains best how human beings come to know their world. Constructivist approaches to curriculum development and delivery value and encourage student and teacher thinking, the very sort of thinking we claim to want of our students but stifle with the managerial busy work of competency based curriculum models.

Check Your Progress

5. Define content analysis.
6. What is the objective of scientific research?
7. What are the two goals of curriculum development?
8. Fill in the blanks.
   (a) The first step of curriculum development research is _____.
   (b) _____is consumer-oriented research related to the needs and requirements of the customer.
   (c) Classroom-based teaching experiments are used to _____ and _____ student learning

8.5 SUMMARY

- Educationist have broadly defined as appliance of those systematic methods and techniques that aid the researchers and others who practice it in understanding and improving teaching and learning procedure.
- Inductive reasoning is generally referred as a 'bottom-up' approach of knowing. In this type of approach, researchers use individual observation to build an abstraction or to portray a picture of the happening that is under study.
- Inductive reasoning generally leads to inductive methods of data compilation where the researcher performs the following functions:
  - o Systematically observes the phenomena under investigation
  - o Searches for patterns or themes in the observations
  - o Develops a generalization from the analysis of the themes
- In comparison to inductive reasoning, deductive reason uses a top-down approach to knowing.
- Deductive reasoning can systematize what is already known and can identify new relationships as one proceeds from known to unknown, but it cannot be relied upon as a self-sufficient method for securing reliable knowledge.
- The two approaches to knowing i.e. inductive and hypothetic-deductive signify two general means to acquire knowledge that is used in curriculum research. Inductive reasoning is most intimately connected with the approaches to research that are qualitative in nature.
- The hypothetic-deductive method has its close connection with the quantitative approaches, which sum up data by means of numbers. Hypotheses and methods of data collection in quantitative research are created before the research begins.

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- Scientific realism is an expression referred to the frame used by the majority of researchers who take up wholly quantitative approach to research. This type of research is characterized by a craving to answer research questions by producing numerical data that represent various constructs and variables.
- Scientific realists consider knowledge as hypothetical and believe that it is therefore subjective to feasible amendment. Testing of all hypotheses is done using statistical tests that sets up the point of confidence that one can have in the results that are obtained.
- Social Constructivists challenges the scientific realist assumption that reality can be reduced to its component parts.
- An effective research literature review is not just a synopsis of research studies and their findings rather it represents a embodiment of the indispensable issues inter-relationship associated with the knowledge, arguments and themes that have already been explored in that area.
- After the precise research question has been posed, a judgment must be taken on which research design must be adopted like whether to adopt experimental or survey method.

  Typical weaknesses that are found in questionnaires include:
  - o Ambiguities in the construction of questions
  - o Unnecessary complexity in the language that has been used
  - o Unsuitable response categories for some questions
  - o Redundant questions
- After the data has been entered, cleaned, and amalgamated, the step which often requires the students, teacher, and school files of a particular school to be attached into one record after which the next step can begin i.e. data analysis can begin.
- Content analysis or textual analysis is a method adopted in the social sciences for studying the content of communication.
- Thus content analysis is a summarizing, quantitative analysis of messages that relies on the scientific method (counting as well as the attention to objectivity, inter-subjectivity, priori design, reliability, validity, generalisability, replicability, and hypothesis testing) and is not limited to the types of variables that may be measured or the context in which the messages are created or presented.
- The self-regulating norms of a scientific community over time are the means of achieving scientific advances. The goal cannot be to develop a single ideal curriculum but rather dynamic problem solving, progress, and advancement beyond present limits of competence.
- Market research is consumer-oriented research related to the needs and requirements of the customer. It is perhaps the most widespread type of research in commercial curriculum development.
- To meet the needs of research and marketability, developers could form early and sustained relationships with publishers to use finding from or conduct, scientific market research; that is inquiry that is fully grounded in the disciples, is in the public view, and is consciously documented or fully reported.

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- Using the cognitive model and learning trajectories as guides, and the task as catalysts, the developer creates more sophisticated models of the thinking of particular groups of students at the same time, the developer describes what basics of the teaching and learning environment, such as specific scaffolding strategies are observed as model may involve is symmetry, modelling, communal processes, training, and combinations of these and many other processes.
- Several classrooms are observed for information about the effectiveness and usability of the curriculum, with an emphasis on the usability and decision-making by such teachers and the conditions under which the curriculum is more or less effect·ve, and how it might be altered or complemented to better serve the latter conditions.
- A related goal is to measure and analyse the critical variables, including contextual variables e.g., setting such as urban/suburban/rural; type of program; class size; teacher characteristics; student/family characteristics) and implementation variables (e.g., engagement in professional development opportunities; fidelity of implementation; leadership, such as principal leadership, as well as support and availability of resources, funds and time; peer relations at the school; 'convergent perspectives' of the developers, school administrators; and teachers in a cohort; and incentives used.
- According to the Constructive approach 'Learning is an active process and Knowledge is constructed from (and shaped by) experience, It states further that learning is a personal interpretation of the world. In simple words it can said that fundamentally, constructivism implies that people construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences.
- Constructivism is a process in which the student is:

  Member of community of learners

  Collaborate among fellow students

  Learn in a social experience i.e. appreciate different perspectives

  Take ownership and voice in learning process
- Constructivism can be defined as a psychologically based notion of development we come to know our world by interacting with it and using our operative cognitive structure to 'explain' what we have perceived.
- Constructivism is also a model of learning since construction of knowledge is often accompanied by the emergence of new cognitive structures.

8.6 KEY TERMS

- **Constructivism:** *As* a perspective in education, explains how knowledge is constructed in the human being.
- **Syllogistic:** A form of deductive *reasoning* consisting of a major premise, a minor premise, and a conclusion.

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- **Inductive reasoning:** Reasoning from experience, sense perceptions, and observations to form a conclusion.
- **Trajectories:** An object moving under the action of given forces.
- **Deductive Reasoning:** Is the process of reasoning from one or more general statements.
- **Qualitative research:** A method of inquiry employed in many different academic disciplines, traditionally in the social sciences, but also in market research.
- **Scientific realism:** The most general level, the view that the world described by science is the real world.

8.7 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Inductive reasoning is generally referred as a 'bottom-up' approach of knowing. In this type of approach, researchers use individual observation to build an abstraction or to portray a picture of the happening that is under study
2. The syllogistic reasoning consists of:
   - A major premise based on a self-evident truth or previously established fact or relationship.
   - A minor premise concerning a particular case to which the truth, facto, or relationship invariably applies.
   - A conclusion if the major and minor premises can be shown to be true, the conclusion arrived at is necessarily true.
3. Scientific realism is an expression referred to the frame used by the majority of researchers who take up wholly quantitative approach to research.
4. Fill in the blanks.
   (d) Causal research
   (e) General and Specific Research Questions
   (f) data collection
5. Content analysis or textual analysis is a method adopted in the social sciences for studying the content of communication.
6. The objective of scientific research is to create new kind of knowledge whereas the aim of curriculum development is the creation of instructional resources.
7. Curriculum development can be referred to be as a design science having two goals. First the goal of building a learning process and second the budding local theories.
8. Fill in the blanks.
   (a) Identifying the subject matter
   (b) Market research
   (c) track and evaluate



M.A. (Education)

SECOND YEAR

MAEDN-503

INSTITUTE OF DISTANCE EDUCATION
IDE
Rajiv Gandhi University

www.ide.rgu.ac.in

EDUCATIONAL EVALUATION AND GUIDANCE IN EDUCATION

EDUCATIONAL EVALUATION AND GUIDANCE IN EDUCATION

MA [EDUCATION]

Second Year

MAEDN - 503

RAJIV GANDHI UNIVERSITY

Arunachal Pradesh, INDIA - 791 112

About IDE

The formal system of higher education in our country is facing the problems of access, limitation of seats, lack of facilities and infrastructure. Academicians from various disciplines opine that it is learning which is more important and not the channel of education. The education through distance mode is an alternative mode of imparting instruction to overcome the problems of access, infrastructure and socio-economic barriers. This will meet the demand for qualitative higher education of millions of people who cannot get admission in the regular system and wish to pursue their education. It also helps interested employed and unemployed men and women to continue with their higher education. Distance education is a distinct approach to impart education to learners who remained away in the space and/or time from the teachers and teaching institutions on account of economic, social and other considerations. Our main aim is to provide higher education opportunities to those who are unable to join regular academic and vocational education programmes in the affiliated colleges of the University and make higher education reach to the doorsteps in rural and geographically remote areas of Arunachal Pradesh in particular and North-eastern part of India in general. In 2008, the Centre for Distance Education has been renamed as "Institute of Distance Education (IDE)."

Continuing the endeavor to expand the learning opportunities for distant learners, IDE has introduced Post Graduate Courses in 5 subjects (Education, English, Hindi, History and Political Science) from the Academic Session 2013-14.

The Institute of Distance Education is housed in the Physical Sciences Faculty Building (first floor) next to the University Library. The University campus is 6 kms from NERIST point on National Highway 52A. The University buses ply to NERIST point regularly.

Outstanding Features of Institute of Distance Education:

(i) At Par with Regular Mode

Eligibility requirements, curricular content, mode of examination and the award of degrees are on par with the colleges affiliated to the Rajiv Gandhi University and the Department(s) of the University.

(ii) Self-Instructional Study Material (SISM)

The students are provided SISM prepared by the Institute and approved by Distance Education Council (DEC), New Delhi. This will be provided at the time of admission at the IDE or its Study Centres. SISM is provided only in English except Hindi subject.

(iii) Contact and Counselling Programme (CCP)

The course curriculum of every programme involves counselling in the form of personal contact programme of duration of approximately 7-15 days. The CCP shall not be compulsory for BA. However for professional courses and MA the attendance in CCP will be mandatory.

(iv) Field Training and Project

For professional course(s) there shall be provision of field training and project writing in the concerned subject.

(v) Medium of Instruction and Examination

The medium of instruction and examination will be English for all the subjects except for those subjects where the learners will need to write in the respective languages.

(vi) Subject/Counselling Coordinators

For developing study material, the IDE appoints subject coordinators from within and outside the University. In order to run the PCCP effectively Counselling Coordinators are engaged from the Departments of the University, The Counselling-Coordinators do necessary coordination for involving resource persons in contact and counselling programme and assignment evaluation. The learners can also contact them for clarifying their difficulties in then respective subjects.

SYLLABI-BOOK MAPPING TABLE

Educational Evaluation and Guidance in Education

Syllabi	Mapping in Book
UNIT I: Measurement and Evaluation: - Meaning, nature and scope of measurement and evaluation - Types of evaluation procedures with special reference to CRE - New trends in evaluation: Choice based credit system, continuous and comprehensive evaluation, question bank	**Unit 1:** Measurement and Evaluation **(Pages 3-38)**
UNIT II: Taxonomy of Educational Objectives: - Cognitive domain and formulation of specific objectives - Affective domain and formulation of specific objectives - Psychomotor domain and formulation of specific objectives	**Unit 2:** Taxonomy of Educational Objectives **(Pages 39-67)**
UNIT III: Characteristics of Good Test: - Reliability and validity - Meaning of reliability - Methods of computing reliability, standard error of measurement - Factors affecting reliability - Meaning and types of validity and factors affecting validity - Relationship between reliability and validity	**Unit 3:** Characteristics of a Good Test **(Pages 69-91)**
UNIT IV: Construction and Standardization of Achievement Test: - Norms: Meaning and significance of norms, types of norms and their usability: Age norm, percentiles, standard scores, Z-scores, T-Scores, Stanine - Meaning and types of achievement teacher made and standardized, steps of construction of achievement test and its standardization	**Unit 4:** Construction and Standardization of Achievement Test **(Pages 93-108)**
UNIT V: Attitude Scale: - Meaning and significance of measuring attitude - Method of construction and standardization of attitude scale: Thurstone and Likert method	**Unit 5:** Attitude Scale **(Pages 109-120)**
UNIT VI: The Concept of Guidance and Counselling: - Meaning, nature and need of guidance - Principles of guidance - Types of guidance: Educational, vocational and personal guidance and group guidance - Meaning, nature and scope of counselling - Types of counselling: Directive, non-directive and eclectic counselling, necessary qualities (personal and professional) of a good counsellor	**Unit 6:** Concept of Guidance and Counselling **(Pages 121-168)**
UNIT VII: Techniques of Guidance and Counselling: - Testing techniques: Test of intelligence, interest, aptitude, creativity and personality - Non-testing technique: Observation, interview and questionnaire	**Unit 7:** Techniques of Guidance and Counselling **(Pages 169-230)**

UNIT VIII: Organization of Guidance and Counselling Services in Schools and Colleges:

- Guidance services: Orientation services, pupil information services, educational services, occupational information services and placement service and follow-up service
- Counselling service-career Talks, career conferences, career tour, career corners
- Role of career master, counsellor, headmaster/principal, teacher and parents

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INTRODUCTION

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Human beings, irrespective of their race, religion and caste, go through the same cognitive processes in their development. They acquire language, learn to perceive, go through the processes of emotional and moral development, and so on. All of these processes shape an individual's understanding of their own self and help mould their social development. However, sometimes, individuals, especially children, undergo experiences that may prove to be traumatic and affect their ability to cope emotionally with their situations. These experiences may be at school, due to peer pressure or the stress of performing, or they may be at home, in the form of divorce or a death.

In situations like these, the child may require help in the form of guidance and counselling from a professionally qualified individual. Such guidance workers are aware of the words and approach to use for drawing out the problem from the suffering children and provide guidance accordingly.

Intelligence is one of the most intriguing aspects of medicine. Not only have researchers failed to describe it in a nutshell, it remains till date one of the most fascinating areas of inquiry. *Educational Evaluation and Guidance in Education* introduces the concept of testing and evaluation to its readers and the importance of guidance and counselling. This book is crucial in explaining how, even though different evaluation scales have been designed, the success is not entirely determined by the efficiency of the test. More often than not, the right test administered to the right individual makes all the difference. The way in which tests are constructed and comprehended is crucial to the process of evaluation. Different tests are designed to examine different attributes of intelligence and its evaluation is contingent on how well these tests have been understood. In other words, the lucidity of a test, inclusive of the kind of questions, is an important factor in determining its success and accuracy.

The book *Educational Evaluation and Guidance in Education* has been designed keeping in mind the self-instruction mode (SIM) format and follows a simple pattern, wherein each unit of the book begins with **Introduction** followed by **Unit Objectives** to the topic. The content is then presented in a simple and easy-to-understand manner, and is interspersed with **Check Your Progress** questions to test the understanding of the topic by the students. A list of **Questions and Exercises** is also provided at the end of each unit, and includes short-answer as well as long-answer questions. **Key Terms** and the **Summary** section is a useful tool for students and are meant for effective recapitulation of the text.

The book is divided into eight units:

Unit 1: Familiarizes the students with the concepts of measurement and evaluation

Unit 2: Deals with taxonomy of educational objectives

Unit 3: Introduces the various types of tests and their characteristics

Unit 4: Analyses the construction and standardization of achievement tests

Unit 5: Deals with the meaning and significance of measuring attitude

Unit 6: Introduces you to the concepts of guidance and counselling and goes on to explain the role, types and principles of guidance

Unit 7: Traces the study of techniques of guidance and counselling

Unit 8: Covers the organization of guidance and counseling in schools and colleges

UNIT 1 MEASUREMENT AND EVALUATION

NOTES

Structure

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1.0 INTRODUCTION

The process of measurement is an essential component of the learning system. The measurement has more administrative utility in education than evaluation. An evaluation process is useful in modifying and improving the learning system and instructional procedure. Measurement is more precise and objective in approach as compared to evaluation.

Measurement is always done of a quality, attribute or variable of a thing or a person. Psychologists and educationists are mainly concerned with the variables and attributes. The process of measurement converts the variables into variety which is used for drawing the inferences. For example, intelligence is quantified in terms of IQ (Intelligent Quotinent) and achievement variable is measured in terms of scores.

In this unit, you will be introduced to the concept of measurement and evaluation in education. You will also learn about the types of evaluation, with special reference to CRE (criterion referenced evaluaiton) and the new trends in evaluation.

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(iv) Know how to plan a test and write the test questions, to be included in it.

(v) Know the educational uses as well as the limitations of educational tests.

(vi) Know the criteria by which the quality of a test should be judged and how to secure evidence relating to these criteria.

1.2.3 Nature of Measurement

To measure the psychological traits with validity and reliability, the measuring instrument or tests should be far away from the aspects like personal errors, variable errors, constant errors and interpretative errors. The important characteristics of good measuring tools are as follows:

(i) **Should be valid:** Validity of a test refers to its truthfulness. It refers to the extent to which a test measures what it actually wishes to measure. Suppose we want to know whether a Numerical Reasoning Test is valid. If it really measures the reasoning ability, the test can be said to be valid.

(ii) **Should be reliable:** Reliability refers to the consistency of a measuring instrument (how accurately it measures). It refers to the faithfulness of the test. To express in a general way, if a measuring instrument measures consistently, it is reliable. For example, a test is administered on English to the students of class VI. In this test, Ram scores 50. After a few days, the same test is administered and Ram scores 50 again. Here, the test is reliable because there is consistency in the result.

(iii) **Should be objective:** Objectivity of a test refers to two aspects: (a) item objectivity (i.e., objectivity of the items), and (b) scoring objectivity (i.e., objectivity of scoring). By 'item objectivity', we mean that the items of the test must need a definite single answer. If the answer is scored by different examiners, the marks would not vary. Ambiguous questions, lack of proper direction, double barrelled questions, questions with double negatives and essay-type questions must be avoided because they lack objectivity. By 'objectivity of scoring', we mean that by whomsoever scored, the test would fetch the same score. Thus, mostly the objective-type questions should be framed to maintain the objectivity of the test.

(iv) **Should be usable and practicable:** 'Usability' refers to the practicability of the test. In the teaching-learning situation, by usability we mean the degree to which the test (or the measuring tool) can be successfully used by teachers and school administrators.

(v) **Should be comprehensive and precise:** The test must be comprehensive and precise. It means that the items must be free from ambiguity. The directions to test the items must be clear and understandable. The directions for administration and scoring must be clearly stated so that a classroom teacher can easily understand and follow them.

(vi) **Should be easy in administering:** If the directions for administration are complicated, or if they involve more time and labour, the users may lag behind. For example, Wechsler Adult Intelligence Scale (WAIS) is a good test, but its administration is very difficult.

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(vii) **Should be economical:** A measurement tool should be less time consuming. The cost of the test must be reasonable so that the schools/educational institutions can afford to purchase and use it.

(viii) **Should be easy in scoring:** The scoring procedure of the test should be clear and simple. The scoring directions and adequate scoring key should be provided to the scorer so that the test is easily scored.

(ix) **Should be easily available:** Some standardized tests are well known all over India, but they are not easily available. Such tests have less usability. It is desirable that in order to be usable, the test must be readily and easily available.

(x) **Should have clear and attractive appearance:** The quality of papers used, typography and printing, letter size, spacing, pictures and diagrams presented, its binding, space for pupil's responses, etc., should be very good and attractive.

1.2.4 Scales of Measurement

In general, measurement is a process of assigning numbers to objects or observations, the levels of measurement being a function of the values under which the numbers are assigned. In mental measurement, our objective is to measure a trait as precisely as possible. However, due to the subjectivity and relativeness of the psychological concepts, it is very difficult to measure it absolutely. For example, it is very difficult to measure the extent to which an individual is obedient. Yet, we can order or rank the individuals as far as the trait in question is concerned. American psychologist Stanley Smith Stevens has attempted a classification of different measurement levels. Also called 'levels of measurement', they are expressed in the following manner:

(i) **Nominal scale:** Nominal scale is used to classify objects. It is the least precise or lowest order scale. Here, the numbers assigned to individuals are not bound by any rule and there is no logical consideration. For example, the pin codes provided to different places and the serial numbers given to cricket players, are only to identify the places or players, respectively. In other words, these values or numbers are simply assigned without any logic where each class is represented by a letter, a name, a number or even a geometrical design. Each number or symbol is like a category name; it has no quantitative significance. This scale is used for students' classification, job classification, and for different types of categorization.

(ii) **Ordinal scale:** In this scale, ranking or grading takes place. It tells us that one observation represents more or less of a variable than the other; but it does not tell how much more or less. Thus, ordinal scale corresponds to quantitative classification of a set of objects with reference to some attribute or rule. For example, when we serially arrange five bags of wheat according to the weight, the heaviest bag is represented by a numeral 1, the next by 2, and so on. More precise comparison is not done with ordinal scale.

(iii) **Interval scale:** Interval scales have an arbitrary zero, not an absolute zero. Interval scale is also known as 'equal interval scale' because these scales show that a person or item is so many units larger or smaller, heavier or lighter, brighter or duller, etc., than the other. In interval scales, the intervals (i.e., the difference between two consecutive points on the scale) are assumed to be equal over the scale.

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All the mental measurement deals with interval scales. In this case, there is no absolute zero point of reference. In mental measurement, the concept of zero is not there; but in case of physical measurement, the concept of absolute zero is well conceived. For example, zero centimetre means absence of length; but in education and psychology, it is difficult to visualize a true zero in any scale used.

For example, a student who scores zero in an achievement test is not supposed to have any knowledge about the subject. In a similar way, an IQ of zero has no meaning. Due to the absence of a true zero point, we cannot say that a child with an IQ of 150 is twice as bright as a child with IQ of 75. Fahrenheit and centigrade temperature scales are examples of interval scale. In Fahrenheit scale, 0°F does not imply absence of heat; so this zero is not absolute and, hence, it is an interval scale. Similar is the case with centigrade scale because 0°C does not imply absence of heat.

(iv) **Ratio scale:** The ratio scale is most concrete and refined among the four basic scales. It has an absolute zero point representing complete absence of the property being measured. Here, a boy with a height of 6 feet is considered to be twice as tall as a boy with a height of 3 feet. In this scale, a true zero point means complete absence of an attribute. In physical sciences and in all physical measurements, we use ratio scales. Measurement of physical dimensions such as height, weight and distance are examples of ratio scales.

1.2.5 Scope of Measurement

American educational psychologist Lee J. Cronbach (1949) classified all applications of mental measurement under the following three main functions:

(i) **Prognosis function:** The first function of measurement is prognosis function. Any test tells about some differences among people's performance at this movement. All decisions involve prediction when psychological test is mentioned, so-called IQ test administered to students in school, to predict their academic performance. The measurement provides the extent of a variable which has the specific purpose of predicting future behaviour.

The prognosis has the administrative function such as classification, selection, promotion and gradation of students. The college students ask a counsellor to help them choose the best curriculum or job. Thus, the guidance and counselling services are also based upon the prognosis function of measurement, i.e., the effectiveness of method, instruction and treatment evaluated on the basis of a student's achievement.

(ii) **Diagnosis function:** The second major function of measurement is diagnosis. The prognosis function reveals the level of a student with regard to certain characteristics, whereas the diagnosis function identifies the weakness of the student-learning. The remedial instruction can be prepared on the basis of diagnosis. It also implies the prediction, but there is considerable justification in listing diagnosis of a separate function of measurement. The diagnostic function establishes the cause–effect relationship, but prediction implies the simple relationship. The instructional procedure can be improved by this function of psychological measurement.

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(iii) **Research function:** The third major function of measurement is verification of scientific hypotheses of research. The use of measurement for research purpose, however, is not much when compared to prediction and diagnosis. This is because a measurement is usually considered a completely valid measure of certain human characteristics. An investigator must treat test scores in this experiment as an accurate quantification of real and useful variable. Measurement provides a more objective and dependable basis for comparison than rough impressions. Thus, the valid generalizations are made on the basis of an accurate measurement.

1.2.6 Methods of Measurement

For both physical and mental measurement, some tools and methods are necessary. The variation of method may be due to the nature of variable and purpose of measurement. The methods of measurement are as follows:

(i) **Tests:** A test consists of a set of questions to be answered or tasks to be performed. Tests are used to assess the ability or trait in question. Psychological and educational tests are a standardized procedure to measure quantitatively or qualitatively one or more than one aspect or trait by means of a sample of verbal or non-verbal behaviours. Items of a test are placed in an increasing order of difficulty and its procedure of administration is standardized to ensure maximum objectivity. The psychological tests are used to know the ability of the students, to diagnose the weakness, to predict the future progress, and to provide educational and vocational guidance. The different types of tests are: achievement tests, intelligence tests, attitude tests, aptitude tests, personality tests, creativity tests, etc.

(ii) **Inventories:** Different inventories are used for different traits. Interest inventories are used to measure interest; personality inventories are used to measure certain traits on personality, etc.

(iii) **Observation:** There are certain traits like honesty, punctuality, persistence, truthfulness, etc., which can hardly be measured objectively via tests. So here, observation is an important technique of measurement. The observation may be participant observation or non-participant observation for accurate and scientific observation. One may use observation schedule and other instruments.

(iv) **Interview:** Interview is a face-to-face interaction between one interviewee and one interviewer or more than one interviewer. There are certain things which an individual does not want to express and they can only be assessed through interviews. The interview schedules may be used and the interviewer through a better personal support, and in congenial atmosphere, can succeed to bring out the inner feelings of the interviewee through carefully planned interviews.

(v) **Checklist:** A checklist consists of a series of items which needs response from the respondent. The presence or absence of an item may be indicated by 'Yes' or 'No' (by a 'Ö' or 'X' against the items). Checklists are popularly employed for appraisal of studies, school buildings, textbooks, outcomes, instructional procedures, etc.

(vi) **Rating scales:** Psychological traits are relative concepts. So it is very difficult to make watertight compartments between them. Sometimes, the degree of a

trait is necessary on the part of the rater. Rating scale is used to evaluate the personal and social conduct of the learner. We take the opinion of teachers or parents or friends or judges on a particular quality or trait of a pupil along a scale. The rating scale may be of 5 points, 7 points, 9 points or 11 points. For example, to assess a particular trait, we can use a 5 point scale as: very good, good, average, below average and poor. The trait in question is marked by the judges in any one of the five categories. Rating scales can be used to evaluate: personality traits, tests, school courses, school practices and other school programmes.

(vii) **Attitude scales:** Attitude refers to the bent of mind or feelings of an individual towards an object, an idea, an institution, a belief, a subject or even a person. Attitude scales are used to measure this trait objectively with accuracy.

(viii) **Projective techniques:** Projective techniques are very ambiguous and subjective in nature. Through projective techniques, the sub-conscious and pre-conscious mind of an individual is reflected. For example, with the help of Thematic Apperception Test (TAT), we measure the personality of individuals.

Anecdotal record cards and cumulative record cards are also used for educational measurement and evaluation.

1.3 CONCEPT OF EVALUATION

Evaluation is an act or process that assigns 'value' to a measure. When we are evaluating, we are making a judgment as per the suitability, desirability or value of a thing. In the teaching-learning situation, evaluation is a continuous process and is concerned with more than the formal academic achievement of students. Evaluation refers to the assessment of a student's progress towards stated objectives, the efficiency of the teaching and the effectiveness of the curriculum. Evaluation is a broad concept dealing not only with the classroom examination system, but also evaluating the cognitive, affective and psychomotor domain of the students. The success and failure of teaching depends upon teaching strategies, tactics and aids. Thus, an evaluation approach improves the instructional procedure. Glaser's basic model of teaching refers to this step as a 'feedback function'.

Check Your Progress

1. Name the two basic types of measurement.
2. What are the important characteristics of a good measuring tool?
3. Mention Stanley Smith Stevens' four levels of measurement.
4. What are the three main functions of applications of mental measurement as per Lee J. Cronbach?
5. Name a few measurement methods.

American educational psychologist Rober J. M. Bradfield defines evaluation as 'the assignment of symbols to phenomenon in order to characterize the worth or value of the phenomenon usually with reference to some social, cultural and scientific standards'. J. M. Wright Stone stated, 'Evaluation is a relative new technical term introduced to designate a more comprehensive concept of measurement than is implied in conventional test and examination'. Professor of education I. James Quillea and Paul R. Hanna defined evaluation as 'The process of gathering and interpreting evidence on change in the behaviour of all students as they progress through school'.

Evaluation takes place with the help of test and measurement. In the classroom situation, the teachers first use classroom tests to evaluate the students according to their different traits. After getting the answer papers, the teachers provide some numerals to them. This step is known as measurement. So, measurement deals with only the quantitative description. After the measurement step, the teachers arrange the students in order, such as, first, second, third according to their achievements.

This step is evaluation. So evaluation is a philosophical and subjective concept. It includes both quantitative and qualitative descriptions, and value judgment.

Therefore, Evaluation = Quantitative Description (Measurement) and/or Qualitative Description (Non-Measurement) + Value Judgments.

1.3.1 Nature of Evaluation

The characteristics of evaluation are as follows:

- It is a systematic process.
- It measures the effectiveness of learning experiences provided.
- It measures how far the instructional objectives have been achieved.
- It uses certain tools like tests, observation, interview, etc.
- It is a continuous process.
- It is a subjective judgment.
- It is philosophical in nature.
- It includes quantitative description, qualitative description and value judgment.
- It gets data from measurement.
- It not only determines the magnitude, but also adds meaning to measurement.
- It involves values and purposes.

1.3.2 Classifications of Evaluation

In order to know how far the students have previous learning, to get the knowledge of the effectiveness of instructional objectives, and to diagnose the problems on the way of achievement of students, the teachers use four types of evaluation. These four classifications of evaluation are as follows:

(i) **Placement evaluation:** Through this evaluation, the entire behaviour of the student is assessed. It is like round peg in the round hole and square peg in the square hole. In this case, the students are given admission to new courses according to their intelligence, attitude, motivation, aptitude, etc. This type of evaluation questions: Does the student possess the knowledge and skills needed to begin the planned instruction? To what extent has the student already developed the understanding and skills that are the goals of the planned instruction? To what extent do the student's interests, work habits and personality characteristics indicate that one mode of instruction might be better than the other? The goals of placement assessment are to determine for each student the position in the instructional sequence and the mode of instruction that is most beneficial. For example, the B.Ed. entrance test is conducted to give admission to the students in B.Ed. course. This type of evaluation is called 'placement evaluation'.

(ii) **Formative evaluation:** It aims at the evaluation of a student's learning progress during the period of instruction. Formative evaluation views evaluation as a process, and thus, it is an integral part of the learning process. It is not terminal in character. Formative evaluation is concerned with both achievement of students during a course of instruction and its improvement. Formative

evaluation is a tool for providing feedback to the teaching-learning process. It is concerned with the teacher, content, instructional objectives and provision of learning experiences. Formative evaluation also helps the teacher to modify the instructional objectives and the methods of teaching, if necessary. Formative assessment depends heavily on specially prepared tests and assessments for each segment of instruction (e.g., unit, chapter). The unit tests, the weekly tests, monthly tests, etc., are examples of formative evaluation.

(iii) **Diagnostic evaluation:** It is concerned with the persistent learning difficulties that are left unresolved by the corrective prescriptions of formative assessment. It aims at identifying or diagnosing the weaknesses of students in a given course of instruction. Diagnostic evaluation involves the use of specially prepared diagnostic tests and various observational techniques. The aim of diagnostic assessment is to determine the causes of persistent learning problems of students and to formulate a plan for remedial action. When a teacher finds that in spite of the use of various alternative methods and techniques, the student still faces learning difficulties, he takes recourse to a detailed diagnosis. This type of evaluation includes vision tests, hearing tests and other tests used to determine how the student approaches to a reading assignment, such as, whether the student relies on pictures, sound out words, use context clues, skip over unfamiliar words, etc.

(iv) **Summative evaluation:** This evaluation comes at the end of a course of instruction. It is designed to determine the extent to which the instructional goals have been achieved, and is used primarily for assigning course grades or for certifying student mastery of the intended learning outcome. Summative evaluation's chief functions are: 'crediting' and 'certifying' the level of achievement of the students, and selecting the students for different courses. It is judgmental and terminal in character. Summative evaluation judges the achievement of students and the efficacy of school programmes, and guides whether the programme or the system is to be accepted or not. University annual examination is an example of summative evaluation.

1.3.3 Scope of Evaluation from Educational Angle

Anything to be evaluated has certain aims and objectives, and through evaluation, we assess how far these objectives have been fulfilled. From an educational angle, we can evaluate many aspects which is the part and parcel of an educational system, such as:

(i) Evaluation of a school site (with reference to its location, building, hygienic condition, strength of students and teachers, etc.)

(ii) Evaluation of a school programme (school syllabus, co-curricular activities, guidance programmes, etc.)

(iii) Evaluation of teaching methods (with reference to aims, purposes, suitability and efficacy)

(iv) Evaluation of total programme of instruction (with reference to cognitive, affective and psychomotor domain)

(v) Evaluation of school administration, discipline, control, management and organization

(vi) Evaluation of the textbooks

(vii) Evaluation of students' growth, etc

The steps involved in an evaluation process take place in a hierarchy. These steps are as follows:

- Evaluating
- Planning appropriate learning experiences
- Selecting appropriate teaching points
- Specifying the desired student behaviour
- Identifying and defining specific objectives
- Identifying and defining general objectives

1.3.4 Techniques of Evaluation

The evaluation process produces the data for cognitive, affective and psychomotor objectives. The traditional examinations confine to cognitive objectives only. In this way, the evaluation is a more broad process. Various types of techniques are used in it. These are as follows:

(a) The oral, written, essay type, objective type, practical examination and observation techniques are used for the evaluation of cognitive objectives.

(b) The interest inventory, attitude scale, values test and observation techniques are employed for appraising the affective objectives.

(c) The performance test, practical examination and observation techniques are employed for assessing the psychomotor objectives.

The criterion test is different from the more traditional achievement test. This is because criterion test is concerned with objectives of teaching and instruction, whereas achievement test concerns with content coverage. There are three major characteristics of a criterion test or techniques of evaluation. These are as follows:

(*i*) *Appropriateness:* The criterion test must cover the terminal behaviour of teaching or instruction. Each item of criterion behaviour should represent the total terminal behaviours.

(*ii*) *Effectiveness:* The items of the criterion test must have difficulty value and discriminative power. The test should be reliable and valid.

(*iii*) *Practicability:* The test can be administered easily and the scoring procedure should be simple. The obtained data may be interpreted and may be made meaningful. It should be acceptable to the teacher and the students.

1.3.5 Classification of Evaluation Techniques

All techniques of evaluation can be broadly classified into two categories: (a) quantitative techniques of evaluation and (b) qualitative techniques of evaluation. A brief description of these techniques is as follows:

(a) Quantitative techniques: The quantitative techniques are mainly used in educational evaluation. These are highly reliable and valid. They possess all three characteristics and can be classified into three types: (i) Oral, (ii) Written and (iii) Practical.

(*i*) *Oral techniques:* This technique of evaluation is used at a lower level in organizing and leading teaching activities. The oral questions, debate and drama are used for this purpose.

(*ii*) *Written techniques:* In this type of evaluation, the written questions are asked and students have to write their answers. The written tests are more effective than oral. The written tests are usually of two types: essay type and objective type. The objective-type tests are now preferred for construction of the criterion test because they are highly objective and reliable.

(*iii*) *Practical techniques:* In this type of evaluation, some work is assigned to the student to accomplish it. Such techniques are based to assess the skill or psychomotor objectives. This technique is used in Science, Geography, Home Science, Agriculture, etc.

(b) Qualitative techniques: The qualitative techniques are used in schools and colleges for internal assessment. These techniques are subjective and less reliable, but they are used for assessing the affective objectives. These techniques are classified into five categories as given below:

(*i*) *Cumulative records:* Such records are prepared in the schools for each student. The cumulative record of the student includes the educational progress, results of monthly, half yearly test, attendance, participation in games, sports, co-curricular activities and physical health. The cumulative record of the students provides the awareness about their progress and weakness of the parents, teachers and principal.

(*ii*) *Anecdotal records:* This type of record maintains the description of significant event and work or performance of the students. A merit list is prepared in schools. The correct information is obtained regarding incident and performance of the students in anecdotal records. The interest and learning of the students can be assessed with the help of such records. Such records can also be used to provide the guidance to students.

(*iii*) *Observation technique:* This technique is indispensable in school evaluation. It is used at all the stages of education, but it is very useful in evaluating the performance of small children at primary stage. It is used for evaluating cognitive, affective and psychomotor objectives. The student of higher class can make use of this technique for self-evaluation. The classroom interaction can be evaluated only by the observation technique.

(iv) *Checklist:* The technique is used for evaluating interest, attitudes and values of the students. It includes certain statements of 'yes' and 'no' type. The student has to check either of the two.

Each statement of the checklist evaluates a specific objective of learning. Some examples are as follows:

- Are you interested in the steps of teaching?
- Do you take interest in lesson planning?
- Do you really enjoy during classroom presentation?
- Are you interested in encouraging the student activities?

The above checklist may be used for evaluating teaching interest of teachers.

(v) *Rating scale:* The rating technique is used for assessing the attitude of the students towards teaching and subjects. It consists of some statements which can be rated on three, five and seven points scale. It is used for higher classes because it requires the power of judgment of the students. A teacher can make use of this technique for evaluating the effectiveness of this instructional procedure, teaching strategy, tactics and aids. The statements of the scale are concerned with the specific objectives of learning.

1.3.6 Types of Evaluation Procedures with Reference to CRE

Tests are tools of measurements, and measurements guide us in evaluation. Different types of tests are in vogue to facilitate the realization of the different purposes of education in the varying contexts of use. They may be categorized as follows:

- Purpose-specific categorization of test-types
- Mode-specific categorization of test-types
- Process-specific categorization of test-types

The tests of one type form a variety absolutely distinct from those of every other type. Also, tests of different types may require the same kind of task, and sometimes even repeat the very same item. That is to say, it is quite possible to find an item recurring in tests which otherwise belong to different types, or even different categories. What distinguishes the test-types, then, is not what is obvious in them but what guided them into being what they are. It is not in the choice of test-tasks, nor in the realization of these tasks in the form of test-items that we are to find the difference. We are to notice the difference: in the overall design of the tests, the purpose that guided them in their construction and sometimes in the nature and extent of coverage of a given area of learning. With this understanding, we can now discuss the features of design of the different test-types.

(a) Purpose-specific category

Purpose-specific category includes test designed to achieve a specific purpose of evaluation. Generally, four test-types are identified in this category. The features of each of these are discussed below:

(i) Diagnostic tests: These help us identify the areas of learning in which the learner needs a remedial course. They give us a profile of what the learner knows and does not know in a given area of learning. To present such a profile, a diagnostic test has to be a battery of a number of sub-tests with each having a fairly thorough coverage.

(ii) Aptitude tests: These tests serve a predictive function. They help us identify potential talents. They identify the prerequisite characteristics which are essential for one to be competent to perform a given task. Presenting items on such sub-skills which may eventually be developed into expert complex skill, these tests identify those who can do well in a field of study or a profession and those who cannot. These tests are generally used for selecting people for special course/ careers.

(iii) **Achievement tests:** These tests aim to measure the extent to which the objectives of a course have been achieved. The scope of these tests is governed by the objectives of the given course, and they cover only the areas of learning demarcated by the given syllabus. You will learn more about these later in the book.

(iv) **Proficiency tests:** These tests aim to assess the general ability of a person at a given time. Its scope is governed by a reasonable expectation of what abilities learners of a given status (say, matriculates or graduates) should possess. It is not restricted by considerations of the areas covered in any specific course-objectives or syllabus as in the case of achievement tests. While the usual end of course-examination in a school or college may be taken as a typical example of an achievement test, a national level selection or admission test for candidates coming from different states and or university jurisdictions can be taken as a typical example of a proficiency test.

(b) Mode-specific category

Under mode-specific category, we identify test-types on the basis of the mode/attitude that governs the construction and use of a test. Under this category, we present six pairs of test-types along six dimensions.

(i) **Formal assessment vs. informal assessment:** Formal assessment is applicable to a situation where a body answerable to the public is holding a test for a selection or an award. In this kind of situation, there should be objectivity, credibility and relevance in the assessment created. In order to have that, the assessmentwill have to follow the preset norms/procedures followed in test construction, administration and interpretation.

An informal assessment serves best in situations where a person or entityis holding a test for obtaining certain specific information from the candidates. While an informal assessment should ideally be reliable and objective as well, the evaluator may or may not choose to justify the methodology to anyone. Therefore, an informal assessment may or may not adhere to the standardguidelines of evaluation.

(ii) **Formative assessment vs. summative assessment:** The objective of a formative assessment is to locate the gaps in the student's knowledge so that the teacher can formulate the lesson accordingly. On the other hand, the objective of the summative assessment is to certify and grade the student according to the level of learning he or she has attained after undergoing the lesson/training. While formative assessment takes place before instruction begins or during the instruction, summative assessment always takes place at the logical end of the instruction, such as a term or a semester or a year. For example, during a six-month long course, a test every fortnight will be considered formative assessment and the test that takes place at the end of six months will be considered summative assessment. Besides this, the complexity of level of generalization in questions in formative and summative assessments will be entirely different. While formative assessments cover a small part of the course and will have more recall-based questions, summative assessment covers the entire course material and will have recall-based as well as analytical questions, so as to test the level of learning of the student at the end of the course.

Another kind of assessment used in educational situations is 'developmental assessment'. It is ideal for the time when the course is under development and is undertaken with a sample group of students which represents the general intelligence of the learner. It is considered a constituent of course development programme.

(iii) **Continuous assessment vs. terminal assessment:** While progress or achievement in learning is the concern of formative vs. summative mode of assessment, it is the purpose of grading learner's achievement which guides the continuous vs. terminal mode of assessment. Continuous assessment seeks to spread the basis of grading on a number of tests with regular even intervals, instead of placing it on one end-of-the course test (terminal test). Continuous assessment, thus, allows for more intense accommodation of the learning content in the test process than the terminal assessment normally does. Scores on a series of continuous assessment test, taken together can serve for summative assessment. Taken individually, a continuous assessment test may be used formatively at the time of its administration. In the same way, a terminal assessment may serve the purpose of formative assessment for follow-up courses.

(iv) **Course work vs. examination:** A learner's assessment can be based on course work(s) performed by him during or at the end of a course, or, it may be based on examination(s) taken by him during or at the end of the course. Evaluation of course work or examination at different points of time during a course can be compiled at the end of the course to serve the purpose of summative evaluation.

(v) **Process vs. product assessment:** The basis for evaluating may be either the final product or the result of a given task or the performance at different stages leading to the accomplishment of the task (as in a research work). While evaluating a learner, one may look for the correct solution to a given problem or may take into consideration the correctness of the successive stages followed to solve the given problem (as in problem-solving tasks). If we do the former, we are supposed to be engaged in product assessment; if we do the latter, we are supposed to make process assessment.

(vi) **Internal assessment vs. External assessment:** The mode of assessment is external when the evaluation of a learner's ability is made by an outsider—a person who is not related with the actual process of teaching. The evaluator and the learner are anonymous to each other in this case. When the assessment is made by the person responsible for effecting the learning being measured, it becomes internal assessment. Formative and summative assessment of both scholastic and non-scholastic abilities is possible in the case of internal assessment. External assessment serves only summative evaluation of scholastic abilities. These are actually different perspectives along which the assessment of learner ability can be thought of and planned accordingly. It is possible to practically combine two or more of these perspectives in one's approach to assessment. For example, one may include both course work and examination as the basis for learner's assessment, and these two may constitute the units of continuous assessment. One may opt for formative assessment of the process

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(iii) **Achievement tests:** These tests aim to measure the extent to which the objectives of a course have been achieved. The scope of these tests is governed by the objectives of the given course, and they cover only the areas of learning demarcated by the given syllabus. You will learn more about these later in the book.

(iv) **Proficiency tests:** These tests aim to assess the general ability of a person at a given time. Its scope is governed by a reasonable expectation of what abilities learners of a given status (say, matriculates or graduates) should possess. It is not restricted by considerations of the areas covered in any specific course-objectives or syllabus as in the case of achievement tests. While the usual end of course-examination in a school or college may be taken as a typical example of an achievement test, a national level selection or admission test for candidates coming from different states and or university jurisdictions can be taken as a typical example of a proficiency test.

(b) Mode-specific category

Under mode-specific category, we identify test-types on the basis of the mode/attitude that governs the construction and use of a test. Under this category, we present six pairs of test-types along six dimensions.

(i) **Formal assessment vs. informal assessment:** Formal assessment is applicable to a situation where a body answerable to the public is holding a test for a selection or an award. In this kind of situation, there should be objectivity, credibility and relevance in the assessment created. In order to have that, the assessmentwill have to follow the preset norms/procedures followed in test construction, administration and interpretation.

An informal assessment serves best in situations where a person or entityis holding a test for obtaining certain specific information from the candidates. While an informal assessment should ideally be reliable and objective as well, the evaluator may or may not choose to justify the methodology to anyone. Therefore, an informal assessment may or may not adhere to the standardguidelines of evaluation.

(ii) **Formative assessment vs. summative assessment:** The objective of a formative assessment is to locate the gaps in the student's knowledge so that the teacher can formulate the lesson accordingly. On the other hand, the objective of the summative assessment is to certify and grade the student according to the level of learning he or she has attained after undergoing the lesson/training. While formative assessment takes place before instruction begins or during the instruction, summative assessment always takes place at the logical end of the instruction, such as a term or a semester or a year. For example, during a six-month long course, a test every fortnight will be considered formative assessment and the test that takes place at the end of six months will be considered summative assessment. Besides this, the complexity of level of generalization in questions in formative and summative assessments will be entirely different. While formative assessments cover a small part of the course and will have more recall-based questions, summative assessment covers the entire course material and will have recall-based as well as analytical questions, so as to test the level of learning of the student at the end of the course.

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of course work, or may include both internal and external assessment to serve the purposes of formative and summative evaluation.

(c) Process-specific category

Sometimes, test-types are identified on the basis of the process of test-construction. We can talk of two pairs of contrastive test-types in this section.

(i) **Teacher made test vs. standardized test:** Standardized tests are commercially produced tests adhering meticulously to certain procedures to meet the demands of objectivity and accuracy. They are finalized through the construction procedures of formulating objectives, designing test-blueprints, employing item try-outs, item-analysis and item-revisions. The teacher-made tests, on the other hand, are not governed rigidly by such processes. The teacher, who makes the tests, uses his discretion in matters of the scope of test area and choice of task-types and items. Standardized tests derive their name by the fact that they ensure standardization of the procedures of administration, scoring and interpretation through elaborate specific instructions.

While a teacher-made test is designed to operate within the restricted situation of a given classroom (in terms of test purpose, construction and use), a standardized test is designed for a larger operational situation crossing the barriers of a classroom, an institution or even a region. A standardized test may be chosen for use by different teachers/institutions in different classrooms on different occasions and in different regions.

Criterion-referenced evaluation (CRE): Criteria are the basis for evaluating the progress of students. They identify, in specific terms, the critical aspects of a performance or product that indicate how well a student is meeting the prescribed learning outcomes. For example, weighted criteria, rating scales or scoring guides (reference sets) are the ways for evaluating student performance using criteria. It is important to give the student time and support required to respond to formative evaluation by increasing the quality of his work. Criterion-referenced evaluation (CRE) is based on prescribed learning outcomes. CRE is the assessment of performance by judging an individual's behaviour, performance or knowledge against specific criteria or standards.

(ii) **Norm-reference tests vs. CRE:** The purpose of CRE or criterion-reference-test (CRT) is to assess the objective. It is an objective-based test. The objective-type test is objective-centred, assessed in terms of behavioural changes among the students. It assesses the ability of a student against the criterion-behaviour of other learners.

In a norm-reference test (NRT), the purpose is to discriminate between the high-achievers and the low-achievers. Its focus is not on what or how much one has learnt. Its focus is on where one stands in relation to the others' calibre/level. It assesses the ability of one against the standard 'norm' of achievement in a test.

1.3.7 Functions of Evaluation

The most common purposes and the related functions for which evaluation is used in an educational system are given below:

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(i) **Placement function:** This may be the purpose of the evaluation when it helps us select suitable persons for a course or career. To study the entry behaviour of students and to provide suitable measures for individualization of instruction, placement assessment takes place.

(ii) **Diagnostic function:** Through measurement and evaluation, we diagnose the weakness of students and the difficulties in learning and suggest remedial programmes to overcome the weakness.

(iii) **Predictive function:** We also predict the future performance of the students through measurement and evaluation. This function also helps a student in selecting the right electives.

(iv) **Instructional function:** The instructional functions of educational evaluation are to:

- Plan appropriate learning strategies
- Assess different educational practices
- Improve instruction and quality of teachers
- Assess and foster students' growth
- Formulate suitable and realistic objectives of instruction
- Assess the effectiveness of different methods and techniques of instruction
- Provide a basis for modification of curriculum and syllabus

(v) **Administrative function:** The administrative functions are to:

- Appraise the different programmes undertaken
- Appraise the supervisory practices
- Classify the students
- Select students for higher courses of specialized courses or even for some jobs
- Promote students to next higher class
- Have appropriate placement
- Compare the performance of children
- Test the efficiency of teachers in providing suitable learning experiences

(vi) **Guidance function:** Having the knowledge of measurement and evaluation, the teacher can know the level of achievement, motivation, intelligence, aptitude, attitude, etc., of the students. According to the outcomes, the students should be provided educational, vocational and personal guidance.

(vii) **Feedback and motivation function:** After evaluation, the students are given appropriate feedback to educational progress, and by it, they get motivated towards teaching-learning process.

(viii) **Communication function:** Educational measurement and evaluation helps in communicating the results of progress to the students, to parents and to the school.

(ix) **Grading and certification:** This purpose is served when evaluation helps in ranking the learners of a given group. Usually, the terminal examination of a course serves this purpose.

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1.3.8 Comparison of Grading System and Marking System

The recent movement in grading has been the result of an honest confession of our inability to measure with precision the human qualities with all their intricate levels of variation and mix-up of observable and non-observable attributes. It has reduced the wide 101 point range of scale to a viable short range. Though grading gives only rough estimates of learner ability, the estimates are more realistic and reliable than the false precision in terms of marks. In other words, grading reduces considerably the chances of error of judgment (however, it also suffers from inaccuracy, which even otherwise cannot be overcome).

The possibility of an error in judgment in awarding one grade-point in the place of another is relatively much less than possibility of awarding 59 marks instead of 60 marks and vice versa. Thus, the 'narrow-range' scale used in grading minimizes the inter-examiner differences in evaluation. Besides, when narrow-range scale is applied, chances of utilizing the whole range are more than when a wide-range scale is used. Irrespective of the subject-variation, the narrow-range scale may, thus, lessen the disparity in the value of scores in different subjects. Thus, the practice of grading tends to overcome the errors of the traditional marking system.

Different bases of grading

Whatever be the mode, all grading involves the use of a set standard. When we say something is 'good', the judgment implies an implicit or overt rating against a set standard—a physical or conceptual model. Similarly, when we grade scores, we describe them to be good, or average or poor when we compare the scores with some standards. These standards may be what the others in the class have scored or what is the expected ideal performance. Thus, basically, grading may be done along two lines, using two different kinds of standards: (i) relative grading standard (i.e., keeping the performance of the whole group of test-takers in the given task as a standard), and (ii) absolute grading standard (i.e., keeping an ideal conception of what a good performance on a given task should be as a standard).

(i) **Relative grading standard:** When a relative grading standard is applied, the learners get grades according to their ranks in relation to the other learners taking the same test. The classical form of relative grading proceeds from a pre-determined plan of learner distribution. It begins with a specification of what percentage of learners are to be grouped under each of the different grades of a chosen scale (the scale may comprise 5 or 7 or 9 grades).

Figure 1.1 represents some distribution modes.

You can notice how the distribution is even and balanced on either side of the central block, which constitutes the 'average group'. The extreme right hand side block gets the same percentage of learners as the extreme left hand side block in each scale. Similarly, the second block from the right end is equal to the second block from the left end. This design of distribution deliberately attempts to put equal number of learners on either side of a fixed average group of learners.

If the distribution is 'represented on a graph-sheet, we will get what is known as a 'normal distribution curve'. It will be a bell-shaped curve evenly shaped on either side of its vertical middle line.

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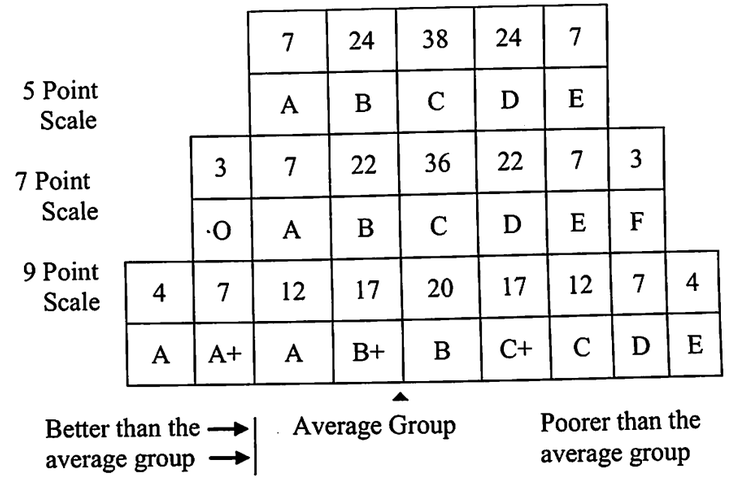


Fig. 1.1 Distribution of Learners of Different Scales of Relative Grading

If there are 300 learners taking a test, the distribution of learners in each percentage (i.e., grade) group will be as given in Table 1.1 (if a 7-point scale is used).

Table 1.1 Distribution of Test-takers on a 7-point Scale

Grade	Percentage	No. of Students out of 300
O	3	← 9
A	7	21 (High)
B	22	← 66
C	36	108 (Average)
D	22	← 66
E	7	21 (Low)
F	3	← 9

The learners are rank-ordered on the basis of their performance (score) in the test. The top nine learners in the rank-order are given the grade 'O', the next 21 in the rank order are given the grade 'A', and so on.

Limitations of relative grading: This kind of normative distribution of grades will be useful to universities, boards of examinations, recruitment/selection boards, and other testing agencies who have to deal with a large number of candidates (say, tens of hundreds at a time) and have to make pass–fail/select–reject decisions, and do not have to find 'what' or 'how much' of a 'subject' has been mastered by the candidates. The latter considerations are the typical concerns of a class teacher, both in formative and summative evaluation, and applied in these situations, the relative grading following normative distribution is bound to have limitations.

(a) Relative grading of a learner's performance in a class test will be inadequate in its message to the learner, the teacher, the parents and whosoever concerned with progress in learning. The position of a learner on the normal curve is determined by the overall performance level of the class. So a grade without any information about the performance of a

class as a whole will not convey much sense pedagogically. A learner who gets 'A' in one class may, when placed in another, get 'F'! So the A's and Fs are meaningless, unless they are accompanied by some information about performance ability of the group to which they belong.

(b) Under 'normative distribution' (another description of relative grading) scheme, each grade has to be assigned to a fixed number of learners in the class. This makes farce of the idea of a teacher attempting to help the 'poor' performers do better or the high-achievers 'improve' their performance. Besides, it also tends to create bad attitude among learners. When a learner manages to come up from a lower grade, it naturally pushes down someone else to a lower grade. A learner may, therefore, develop negative attitude and be tempted to hope that his classmates do as poorly as possible so that his efforts will be better in comparison. This can inhibit learners from helping one another and can even hurt social relations among them.

(ii) Absolute grading standards: While applying relative grading standards, we fix for each grade the number of learners to be assigned. However, when we apply absolute grading standards, we fix for each grade a range of scores for a learner to credit with, in order to claim the grade mentioned against them:

Table 1.2 shows the distribution of a scorer on absolute grading standards.

***Table 1.2** Distribution of Scorer on Absolute Grading Standards*

	Grade	Range of Scores
	O	(90-100) %
	A	(80-89) %
	B	(70-79) %
Average ▸	C	(60-69) % ▸ Reference point
	D	(50-59) %
	E	(40-49) %
	F	Less than 40%

In another form of absolute standards, one may fix the quantum of content and/ or the level of mastery of given skills in a relative hierarchy of the groups of relevant attributes (like creativity, intelligence, imagination, resourcefulness, simplicity, etc., besides relevance and appropriateness of the content and the form expected of the responses) for each grade to be awarded. The grading scheme following such absolute standards in terms of qualitative (in the place of percentage) values is sometimes called 'criterion-reference grading'.

While the percentage standards can be applied to grade the performance on objective (fixed-response) items, the qualitative standards facilitate grading the performance on subjective (free-response) items.

The absolute grading standards are ideal to evaluate and grade students. However,there are some difficulties in putting them into practice. The fixation of standards (quantitative and qualitative) has to be flexible and accommodative as the learners' scores depend on the facility level of the test administered. Formulating reasonable base for the standards is not easy at all levels and all types of courses. They may be done with relative case at higher levels and in vocational courses rather than at lower levels and in non-vocational courses.

Process of grading

The attempt to develop a narrow-range grading, as a consequence of realizing the weaknesses of marking on a 101-point scale, has led to the suggestion for grading on different scales and of adopting different approaches. The approach has to be suitable to the type of composite tests made up of different item-types that are most commonly in use today. It allows the use of different short-range scales to suit the types of responses expected of different item-types. It is more reliable also because the choice of scale for each item-type is governed more or less by the number of 'test-point' it presents.

For instance, in an objective type item, the response can either be right or wrong. There cannot be any range of quality within which the responses can vary. So responses to such questions can be graded only on a two-point scale (0–1), where '1' represents an acceptable response and '0' an unacceptable one. However, in the case of short-answer (free-response) type question, the range of coverage of the subject matter may be restricted to a few value-points, say, 3 or 4. In such a case, both a 7-point scale and a 2-point scale may tend to enhance imprecision. The levels of quality of the response may not vary so much as to warrant a 7-point scale, and at the same time, the responses may not be totally devoid of variations so as to allow for a binary operation of a 2-point scale. So a scale in between has to be applied say, a 3-point scale (0–2), where '0' can mean an unsatisfactory response, '1' an answer of mediocre quality, and '2' an answer of appreciable quality.

While evaluating a long-answer (essay) type question, we may come across responses of varying qualities, and we may use a 5-point (7- or 9- point) scale. The grading can be done taking into account some relevant attributes, such as adequacy relevance of the content, clarity of the form, intelligence or imagination of the presentation.

1.4 NEW TRENDS IN EVALUATION

Higher education in India has seen many changes in the last 50 years. After the Kothari Commission report in 1966, a debate on college autonomy began and a few colleges became autonomous since 1978, and recently, a few of them have completed 25 years of this freedom. Academic freedom has led colleges to formulate new curricula, start relevant courses, design new syllabi and establish new evaluation techniques. These have made the Indian education system more comprehensive and modern. Let us learn more about the new methods in the following sections.

1.4.1 Choice Based Credit System (CBCS)

Research and experience has revealed that the learner-centric contextual curriculum recommended and the desired learner outcomes projected can be achieved mainly through Choice Based Credit System (CBCS). The system, which is implemented in most universities of North America and Europe, is considered a fundamental tool for transforming the orthodox and outdated system of higher education in India. CBCS functions on a modular pattern based on module/units called 'credits'. Here, credit defines the quantum of contents/syllabus set for a course/paper and decides the

Check Your Progress

6. State the types of evaluation.
7. What are the four types of 'errors of measurement'?
8. Name the two kinds of grading standards.
9. What is criterion-referenced evaluation?

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minimum number of teaching-learning hours required. One credit denotes 15 hours of instructions per semester. CBCS permits students to:

1. Learn at their own pace.
2. Select subjects from a broad range of electives offered by the university.
3. Opt for supplemental/value added courses and obtain more than the requisite credits, based on the learner's capabilities.
4. Implement an interdisciplinary approach in education.
5. Utilize the expertise of faculty across the university apart from the specific department faculty.
6. Acquire knowledge, skill and attitude of learning outcomes through participatory teaching and learning and continuous evaluation process.

1.4.2 Continuous and Comprehensive Evaluation

The term Continuous and Comprehensive Evaluation (CCE) refers to the two important and essential conditions of evaluation. These are: (i) continuous evaluation and (ii) comprehensive evaluation. The meaning of continuous evaluation is that the evaluation of learners at levels of schools should be done on continuous basis, i.e., throughout the year or session, rather than only at the end of a session, course or class. The evaluation system for students' achievement in all domains of personality development should be scattered throughout the course, such as on weekly basis, monthly basis, quarterly basis or unit-end test, and chapter-end test. This type of evaluation is called continuous evaluation and it is done by the teachers of the school; therefore, it is also called internal assessment or evaluation. Internal evaluation mechanism puts teachers as well as students focused on teaching and learning and, therefore, gives better results as compared to one-time evaluation which is done at the end of the course. The whole academic session is utilized properly by the teachers and the students.

The other aspect is comprehensive evaluation which means that the evaluation process should cover all aspects of personality development of the students, i.e., scholastic as well as non-scholastic areas. There have been drawbacks in our evaluation system for a long time. The main flaws have been that the evaluation system has been lop-sided, i.e., evaluating only one or two domains, the cognitive and psychomotor. Even in these two domains, it only evaluates the cognitive domain in depth and psychomotor domain very little. It neglects the affective domain completely. Under comprehensive evaluation of learners, there is a consideration that their interests, attitudes, values, personal and social qualities, and proficiencies in co-curricular activities are taken proper care of along with the development of cognitive and psychomotor abilities, i.e., knowledge, understanding, application, analysis, synthesis, evaluation and skill in the area of study. Continuous and comprehensive evaluation is essential for promoting the all-round development of the learners. The all-round development of the children or learners at any level of education involves the development of both scholastic and non-scholastic areas of pupils' personality, that is development in all the three domains—cognitive, affective and psychomotor domains of personality.

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H. S. Srivastava, ex-professor and head of NCERT's department of educational measurement and evaluation, has given a scheme of continuous and comprehensive evaluation in his book titled *Comprehensive Evaluation in Schools* published by NCERT (National Council of Educational Research and Training) in 1989. Table 1.3 depicts the scheme of continuous and comprehensive evaluation adapted from the scheme given in H. S. Srivastava's book.

Table 1.3 Scheme of Continuous and Comprehensive Evaluation

SCHOLASTIC AREAS	
A. Curricular Areas 1. Knowledge 2. Understanding 3. Application 4. Analysis 5. Synthesis 6. Evaluation 7. Skills	**I. Evaluation Techniques:** (i) Written (ii) Oral (iii) Practical or Performance Test **II. Tools for Evaluation:** (i) Teacher-made test (Questionnaire, Diagnostic Unit and Performance Test) (ii) Standardized achievement test (iii) Assignments or home-work (iv) Quizzes (v) Debate and group discussion (vi) Extempore (vii) Seminar **III. Periodicity of Evaluation:** (i) Weekly, bi-weekly, monthly, quarterly, etc. (ii) Terminal tests (iii) Random tests **IV. Coverage:** All students
B. Intelligence	**I. Evaluation Techniques:** (i) Performance tests (ii) Paper-pencil tests **II. Tools of Evaluation:** Standardized tests of intelligence and performance **III. Periodicity of Evaluation:** Yearly, at the beginning of the academic year. **IV. Coverage:** All students
NON-SCHOLASTIC AREAS	
A. Personal and Social Qualities: 1. Regularity 2. Punctuality 3. Discipline 4. Cleanliness 5. Emotional stability 6. Initiative 7. Cooperation and coordination 8. Sense of responsibility 9. Hard-working 10. Civic sense 11. Spirit of social service 12. Tense or relaxed 13. Patient or impatient 14. Achievement orientation 15. Domineering	**I. Techniques of Evaluation:** Observation (Direct and Indirect) **II. Tools of Evaluation:** (i) Anecdotal records (ii) Rating scales (iii) Observation schedule (iv) Checklist **III. Periodicity of Evaluation:** (i) Regularly (Continuous evaluation) (ii) Grading once in each term based on continuous evaluation **IV. Coverage:** All students

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NON-SCHOLASTIC AREAS	
B. Interests: 1. Literary 2. Scientific 3. Musical 4. Artistic 5. Social service	These interests and attitudes should be graded on 5-,7-9 point scales. If neither positive nor negative aspect is observed in a student for any particular personal or social qualities, interests and attitudes, then the student should be given the average grade or middle value.
C. Attitudes: 1. Towards teachers 2. Towards parents and society 3. Towards studies 4. Towards class/schoolmates 5. Towards school activities 6. Towards school assets 7. Towards nature and environment	
D. Physical Health: 1. Height 2. Weight 3. BMI (Body Mass Index) 4. Chest expansion 5. Physical defects (if any) 6. Eye defects 7. Hearing capacity 8. Teeth 9. History of disease (if any)	**I. Techniques of Evaluation:** (i) Medical check up by doctor (ii) Observation by teachers (Class teacher as well as physical education teacher) **II. Tools of Evaluation:** (i) Rating scales (ii) Observation schedule (iii) Medical instruments to be used by the medical specialist/doctor **III. Periodicity of Evaluation:** Once every six months or as fixed by the higher authority **IV. Coverage:** All students
OTHER AREAS (Educational, Sports, Cultural Activities etc.)	
A. Literary and Scientific 1. Library work 2. Debate 3. Recitation 4. Creative writing 5. Talks 6. Clubs 7. Museums	**I. Techniques of Evaluation:** (i) Observation **II. Tools of Evaluation:** (i) Observation schedule (ii) Rating scale (iii) Anecdotal records **III. Periodicity of Evaluation:** At least once every month **IV. Coverage:** Library work for all students and minimum one of the remaining literary, scientific and cultural activities for each student
B. Cultural 1. Drawing and painting 2. Drama 3. Music 4. Dance 5. Sculpture 6. Artistic embroidery	**I. Techniques of Evaluation:** (i) Proficiency test (ii) Observation **II. Tools of Evaluation:** (i) Observation schedule (ii) Anecdotal record (iii) Rating scales (iv) Performance test **III. Periodicity of Evaluation:** Monthly **IV. Coverage:** Games and sports for all students and minimum one of the remaining activities for each student
C. Outdoor Activities 1. Games and sports 2. Swimming 3. Gymnastics 4. N.C.C. 5. N.S.S. 6. Scouting 7. First aid 8. Junior Red Cross 9. Community surveys and services 10. Community-based craft	

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Other elements that make up the system of continuous and comprehensive evaluation are assignments, periodic tests, progress report and cumulative records. Let us study each of these in detail.

(a) Assignments

According to Chambers 21st Century Dictionary, 'assignment' means 'a task or duty that has been selected for someone to do' or an 'an exercise that is set for students'. It is used as a teaching method in all subjects at secondary and senior secondary levels. Considering the subject of study, nature of content and the time available, the subject teacher determines the number of assignments for the academic calendar. While designing assignments, the subject teacher takes care of the abilities, interests and levels of the class and the group who has to work on the assignment.

An assignment combines the merits of lecture-cum-demonstration method and the individual laboratory method. The success and the effectiveness of this method totally depends on proper development and planning of the assignments.

The assignment given to students to work at secondary and senior secondary levels may be classified into the following two categories:

1. Home assignment

This is the assignment given to the student to complete at home and includes writing of answers to questions, problem solution, reading text, etc. These assignments are given by teachers. Along with the assignment, the teacher also gives references from different sources concerning the topic so that the students can take help from them. Learners go through the textbooks, reading materials and other sources referred by the teacher and grasp the idea of the assignment. They may consult libraries, seniors and other sources available to them. They prepare the answers to the questions or solve the problem given to them by the teacher. They bring the assignment file to the school and hand it over to the concerned teacher for evaluation. The teacher evaluates the answers, gives grades or marks as per the provision and tries to find out discrepancy (if any) therein. The teacher also gives feedback to the students for improvement in future. The feedback may include:

- Further reading required by the student
- Any textbook which should have been consulted by the student
- Suggestion whether the answers were up to the mark or needed improvement
- Advice on what special matter could have been added in the answers
- Suggestion about the presentation of ideas/answers, etc.
- Any other suggestion that may have been considered by the teacher or the examiner

2. School assignment

It is the assignment which is prepared or planned at home and performed or conducted in the school or laboratory. Assignment of this category includes performing experiments in the laboratory and preparing answers of the questions that have been put up by the teacher. School assignments can be divided into the following two parts:

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(*i*) **Preparatory part:** In this part, the teacher demonstrates experiments to the class. He conducts those experiments in front of students which are difficult, complex and carry some risk, or those experiments which require costly apparatus to be used with precautions. Students observe the demonstration and participate in the discussion with the teacher. Those experiments which are simple in nature, are assigned to the students. They are instructed to study about these experiments at home as well as in school (if time allows). The teacher gives references of useful textbooks and other sources for this purpose. Detailed instruction regarding the experiment is given in the assignment and the pupil works accordingly under the guidance of the teacher.

(*ii*) **Laboratory part:** Before entering into the laboratory, students hand over the notebooks to the teacher. They are supposed to answer a few questions before entering into the lab related to the experiment to be conducted by them. The teacher evaluates the notebooks. If the teacher gets satisfied with the work in the notebooks and with the oral answers of the students, he or she allows them to enter the lab and conduct a planned experiment. The teacher may not allow a student to do practical if his theory work or preparatory part of the school assignment is not completely satisfactory.

Objectives of assignment method of teaching

The assignment method of teaching has the following objectives:

- To develop habit of self-study among students
- To nurture the habit of inquiry, hard work and taking initiatives
- To develop self-reliance and self-confidence among the students
- To assure the proper utilization of students' leisure time
- To develop hidden abilities of the students
- To develop the attitude of self-help among students

When should an assignment be given?

An assignment is normally given to the students on the following three occasions:

(*i*) At the beginning of the unit with the aim to prepare students in advance for further studies.

(*ii*) During the teaching-learning of a unit of the content when various problems come up under one umbrella concept. A part of the problem is solved by the teacher in the class and rest are given to the students as assignments.

(*iii*) At the end of the section or unit to evaluate students' learning of various concepts through the assignment.

Key points for planning an assignment

The success of the assignment totally depends on how the teacher plans, executes, supervises and evaluates it. The teacher should keep in mind the following key points while preparing an assignment:

- It should be planned and allotted considering the age, intelligence, interests, abilities, aptitudes, etc.. of the students.

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- It should be challenging to students to motivate them. It should be neither too tough nor too easy.
- It should be planned with the cooperation and discussion of the pupils concerned.
- The teacher should ensure the availability of related resources before finalizing an assignment. It is useless to give an assignment for which no resource is available.
- Complete instructions must be given to students regarding the work in the assignment. The instructions must not be vague, ambiguous or confusing.
- The laboratory assignment should clearly specify the precautions to be taken by the students, possible sources of errors in the assignment or experiment, method of collecting data or record, the tabular columns to be drawn for data feeding and the number of observations to be recorded.

7. Details of the apparatus required for the experiment should be mentioned clearly.
8. It is better to indicate the allotted time for every part of the assignment separately.
9. Questions for the students framed by the teacher must fulfil the following criteria:
   - They should be comprehensive in nature, i.e., They should cover all portion of the content.
   - They should be able to test the understanding and application ability of the pupil.
   - They should be objective in nature.
   - They should involve testing laboratory applications and precautions.
   - They should involve drawing and labelling skills (if possible).

Salient features of a good assignment

The following are the salient features of a good assignment:

- It should be appropriate to the unit under study.
- It should have clearly stated and realistic objectives.
- It should stimulate reflective thinking, imagination and creativity among students.
- It should take care of the individual differences among students, i.e., it should be designed considering the age, level, intelligence, abilities, available resources and interests of all the students.
- The language of the assignment must be simple, non-ambiguous and to the point.
- The instructions must be very clear.

Merits of assignment method

The assignment method has the following merits:

- It is based on 'learning by doing' approach.
- Students work at their own pace and time.
- This method takes care of the individual differences among pupil.
- It nurtures the habit of self-reliance, self-dependence and self-confidence among students.

- Opportunity of individual attention to the students is possible.
- Laboratory facilities can be utilized effectively.

Demerits of assignment method

The assignment method has the following demerits:

- Generally, it is taken very casually. Teachers do not work properly on assignments; only students do on their own. Teachers check the assignment seriously. The reason behind this flaw is that it takes much of the teachers' time.
- Chances of copying are much higher in this method of teaching.
- It hinders in timely completion of the syllabus.
- It requires well-equipped library and laboratory, and resourceful teachers, which are rarely available to the students.
- All content area cannot be taught through this method. It has its own limitation.

Practical suggestions for making assignment method a success

Through the following suggestions, the assignment method can be made successful:

- Apply this method in secondary and senior secondary classes because students at this level are mature enough to work on assignments.
- The teacher must plan well and select the relevant topics which may be completed through assignments. While selecting topics for assignments, students' interest, intelligence, age, aptitude, creativity and resource availability must be kept in mind.
- Teacher should be satisfied with the preparatory work of the students before giving them permission for carrying out practicals in the lab or field work.
- Progress of the students in the assignments must be checked by the teacher on regular basis.
- Teacher should be available to the students at all time for any kind of help they may need. It makes students confident and ensures proper help and guidance in the hour of need.

(b) Periodical and annual tests

The tests which are conducted on regular intervals are referred to as periodical tests. These tests are very important as far as the continuous and comprehensive evaluation is concerned. Some of the important types of periodical tests are as follows:

1. **Weekly test:** It is conducted every week on a particular day fixed by the teacher.
2. **Unit test:** It is conducted at the end of every unit. In general practice, this test is conducted on any one day of the week on a regular basis. Students generally call it by the names of the day on which it is conducted like 'Monday Test', 'Tuesday Test', etc. Generally, weekly tests and unit tests are the same.
3. **Monthly test:** This test is conducted on monthly basis. The content of this test covers that part of the syllabus which has been covered during the month.

4. **Quarterly test:** This test is conducted in every three months. The syllabus of the test covers that part of the syllabus which has been completed during the three months' period.
5. **Half-yearly test:** This test is conducted in every six months and it constitutes that part of the syllabus prescribed for the six months.
6. **Annual test:** This is the final test or summative test for the whole academic year. It covers the entire syllabus and is conducted to judge the overall achievement of the students. Results are declared on the basis of this test.

The periodical tests are very important as far as the achievements of the students are concerned. Teachers as well as students work very hard throughout the year for achieving the objectives of education in that particular academic year. Periodical tests expect regular hard work on the students' part and provide them motivation and encouragement for learning. They reduce the loss of time and energy of the students.

(c) Progress reports

A progress report is very important as it shows the progress of a student in his or her areas of study and various activities related to the curriculum or course. It is important due to the following reasons:

- It provides the students with a kind of motivation, satisfaction and makes them aware about the level of their performance.
- It gives feedback to the students for their efforts in learning.
- It makes students aware about the weak areas so that they can work on them properly.
- Parents get an opportunity to be acquainted about the progress of their wards.
- With the help of a progress report, parents can arrange the necessary study support for their sons and daughters.
- The school administration gets to know about the performance of its students as well as its teachers in various subjects.
- Remedial classes may be arranged by the schools for weak students as per the records brought out by the progress report of the students.

A student's 'cumulative record' is the record of all the personal and social qualities, values, attitudes, co-curricular activities and his or her behaviour in the classroom. This kind of record helps in the overall development of a student.

(d) Cumulative records

The following are the important features of the cumulative records:

- A cumulative record helps in appreciating each student's academic and behavioural performance in the class.
- After constant observation and complete evaluation, every student can be categorized into special groups in the classroom on the basis of his or her interests and abilities.
- Cumulative records can contain a wealth of information for teachers and other staff to help the students in implementing various effective instructions and

strategies to support them in their academic and social development in and beyond the classroom.

- The record includes the recording of all the activities, special interests, hobbies and personality traits of a student in a systematic order.
- It is important for teachers to have a complete understanding of the learning abilities of every student to maintain his or her cumulative record.
- It is an effective current and future guide in tracking the progress of a student as it serves as an additional information base for providing vocational and academic guidance to the student.
- Special areas of academic or behavioural weaknesses can be identified in the student's cumulative record and the teacher can design a programme to include corrective actions in order to minimize the various weaknesses.
- The cumulative record helps teachers to adopt different teaching methods or strategies according to the measured skill levels of students.
- The cumulative record also helps teachers to adopt suitable, remedial teaching measures and curriculum modification in addressing student's learning difficulties.
- A student's cumulative records can provide information for the effective execution of behaviour modification strategies in a class.

1.4.3 Question Bank

As the name suggests, a question bank is a collection of questions from a particular subject, covering each and every unit or chapter of the course. The questions are designed in such a manner that it covers all chapters and all content areas of the subject. It includes all types of questions like objective types and descriptive types.

Among the objective-types items, it may include multiple-type questions, fill in the blank type question, true and false type questions, matching-type question and some other types as the question bank developer thinks suitable. Among the descriptive type items, the main types of questions are very short-answer type questions, short-answer type questions, long-answer type question and very long-answer type questions and essay-type questions.

Question banks help students and teachers in many ways. Teachers can use questions from the question banks in evaluating student's performances and in diagnosing their weaknesses. Students may also use question banks for testing themselves. If they find any difficulty in solving any problems from the question bank, they consult their teacher and get the problems discussed and solved. Question banks also help students in developing confidence as they evaluate themselves by solving the problems given in it. They indicate the coverage of syllabus to the students. As it contains questions of varying difficulty levels, the students and the teachers can use a question bank in a better way for proper guidance to all students having the individual differences.

A question bank plays vital role for those students who are preparing for any competitive examinations like engineering entrance test, medical entrance tests, etc.

To prepare a question bank, you must:

1. **Ensure that there are all types of questions:** Objective-type questions, short-answer questions, long-answer questions, questions requiring illustrations, diagrams etc. The main thing is that the question bank must be exhaustive as far as the content coverage is concerned.
2. **Ensure that there are all levels of questions:** There must be all levels of questions in a question bank. These levels pertain to complexity, from very simple to very complex questions, in order to prepare the student fully for examination.
3. **Ensure there are questions from previous years' question papers:** Sometimes, examiners setting papers use cryptic language to form questions. Students should be used to interpreting complicated language in questions, and this can be achieved by allowing them to practice with questions from old exam papers.
4. **Provide answers at the end:** A good question bank always contains answers at the end. Otherwise there is no way for the student to confirm if he/she has answered correctly. For mathematical problems or Physics numerical questions, there need not be the entire solution, but just the final answer.

1.5 SUMMARY

In this unit, you have learnt that:

- Measurement answers the question of 'how much'. The application of the principles of measurement in the field of education is known as educational measurement.
- To measure the psychological traits with validity and reliability, the measuring instrument or tests should be far away from the aspects like-personal errors, variable errors, constant errors and interpretative errors.
- There are four types of scales of measurement: (i) nominal, (ii) ordinal, (iii) interval and (iv) ratio.
- The first function of measurement is prognosis function; the prognosis has the administrative function such as classification, selection, promotion and gradation of students.
- The prognosis function reveals the level of a student with regard to certain characteristics, whereas the diagnosis function identifies the weakness of the student-learning.
- The third major function of measurement is verification of scientific hypotheses of research.
- A checklist consists of a series of items which needs response from the respondent; these are popularly employed for appraisal of studies, school buildings, textbooks, outcomes, instructional procedures, etc.
- Evaluation refers to the assessment of students' progress towards stated objectives, the efficiency of teaching as well as the effectiveness of the curriculum.

Check Your Progress

10. Define continuous evaluation.
11. Who wrote the book Comprehensive Evaluation in Schools?
12. What is a home assignment?
13. State two features of cumulative records.

NOTES

- There are four types of evaluation: (i) placement, (ii) formative, (iii) summative and (iv) diagnostic.
- Evaluation = Quantitative Description (Measurement) and/or Qualitative Description (Non-Measurement) + Value Judgments.
- Rating scale is used to evaluate the personal and social conduct of the learner.
- Formative evaluation views evaluation as a process, and thus, it is an integral part of the learning process.
- The aim of diagnostic assessment is to determine the causes of persistent learning problems of students and to formulate a plan for remedial action.
- All techniques of evaluation can be broadly classified into two categories:

  (a) quantitative techniques of evaluation and (b) qualitative techniques of evaluation.
- Different types of tests are in vogue to facilitate the realization of different purposes of education in varying contexts of use. These may be: (i) purpose-specific categorization of test-types, (ii) mode-specific categorization of test-types and (iii) process-specific categorization of test-types.
- Formative assessment is concerned with identifying a learner's weaknesses in attainment with a view to help the learner and the teacher overcome/remedy those, while summative assessment aims at certifying and grading the attainment of the learner at the end of a given course.
- Continuous assessment seeks to spread the basis of grading on a number of tests with regular even intervals, instead of placing it on one end-of-the course test (terminal test).
- Formative and summative assessment of both scholastic and non-scholastic abilities is possible in the case of internal assessment.
- Though grading gives only rough estimates of a learner's ability, the estimates are more realistic and reliable than the false precision in terms of marks.
- When a relative grading standard is applied, the learners get grades according to their ranks in relation to the other learners taking the same test.
- A grade without any information about the performance of a class as a whole will not convey much sense pedagogically.
- Comprehensive evaluation is concerned with scholastic and non-scholastic areas.
- Home assignment is the assignment that is given to a student to be completed at home and includes writing of answers to questions, problem solution, reading text, etc.
- The success of the assignment totally depends on how the teacher plans, executes, supervises and evaluates it.
- Periodical tests are very significant as far as the continuous and comprehensive evaluations are concerned.
- A student's 'cumulative record' is the record of all the personal and social qualities, values, attitudes, co-curricular activities and his or her behaviour in the classroom.

1.6 KEY TERMS

NOTES

- **Measurement:** It is the process by which the attributes or dimensions of some physical object are determined.
- **Quantification:** It indicates to what extent a particular attribute is present in a particular object.
- **Ordinal scale:** It corresponds to quantitative classification of a set of objects with reference to some attribute or rule.
- **Evaluation:** It is the assessment of a student's progress towards stated objectives, the efficiency of the teaching and the effectiveness of the curriculum.
- **Achievement test:** It is a test that measures the outcomes of learning after the teaching-learning process is over.
- **Periodical tests:** These are the tests that are conducted on regular intervals in the classes or labs.
- **Cumulative record**: It is the record of a student's personal and social qualities, values, attitudes, co-curricular activities and his or her behaviour in the classroom.

1.7 ANSWERS TO 'CHECK YOUR PROGRESS'

1. The two basic types of measurement are: (i) physical measurement and (ii) mental measurement.
2. The important characteristics of a good measuring tool are as follows:
   (i) It should be valid.
   (ii) It should be reliable.
   (iii) It should be objective.
   (iv) It should be usable and practicable.
   (v) It should be comprehensive and precise.
   (vi) It should be easy in administering.
   (vii) It should be economical from the viewpoint of time, energy and money.
   (viii) It should be easily available.
   (ix) Its get up or appearance must be good and attractive.
3. Stanley Smith Stevens' levels of measurement are: (i) nominal scale, (ii) ordinal scale, (iii) interval scale and (iv) ratio scale.
4. Lee J. Cronbach (1949) classified all applications of mental measurement under the following three main functions: (i) prognosis function, (ii) diagnosis functions and (iii) research function.
5. The methods of measurement are as follows: (i) tests, (ii) inventories, (iii) observation, (iv) interview, (v) checklists, (vi) rating scales, (vii) attitude scales and (viii) projective techniques.
6. The four types of evaluation are: (i) placement, (ii) formative, (iii) diagnostic and (iv) summative.

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7. 'Errors of measurement' can be classified into four types: (i) personal errors, (ii) variable errors, (iii) constant errors and (iv) interpretive errors.
8. Basically, grading may be done along two lines, using two different kinds of standards:
   (i) Relative grading standard (i.e., keeping the performance of the whole group of test-takers in the given task as a standard).
   (ii) Absolute grading standard (i.e., keeping an ideal conception of what a good performance on a given task should be as the standard).
9. Criterion-referenced evaluation is the assessment of performance by judging an individual's behaviour and performance or knowledge against specific criteria or standards.
10. The meaning of 'continuous evaluation' is that the evaluation of learners at levels of schools should be done on a continuous basis, i.e., throughout the year or session, rather than only at the end of a session, course or class.
11. H. S. Srivastava, ex-professor and head of NCERT's department of educational measurement and evaluation, is the author of *Comprehensive Evaluation in Schools*.
12. Home assignment is the assignment given to a student to complete at home and includes writing of answer to question, problem solution, reading text, etc. These assignments are given by teachers.
13. The two features of cumulative records are as follows:
   (*i*) A 'cumulative record' helps in appreciating each student's academic and behavioural performance in the class.
   (*ii*) The record includes the recording of all the activities, special interests, hobbies and personality traits of a student in a systematic order.

1.8 QUESTIONS AND EXERCISES

Short-Answer Questions

1. List the characteristics of good measurement.
2. Enumerate the types of scale for measurement.
3. List the techniques of evaluation.
4. Write a note on criterion-referenced evaluation.
5. Differentiate between physical and mental measurement.
6. How should continuous and comprehensive evaluation be implemented in schools?
7. Differentiate between home and school assignments.
8. List the salient features of a good assignment.
9. List the importance of a progress report.
10. What is a question bank?

Long-Answer Questions

1. Write a detailed note on educational measurement.
2. Describe the various scales of measurement.
3. Elaborate on the different tools of measurement.
4. Explain the functions of evaluation.
5. Describe the standard scheme of continuous and comprehensive evaluation as given by H. S. Srivastava.

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NOTES

UNIT 2 TAXONOMY OF EDUCATIONAL OBJECTIVES

Structure

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2.2 Educational Objectives and their Classification
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  2.3.1 Classification of Cognitive Domain
  2.3.2 Assessment of Cognitive Learning
  2.3.3 Thinking Skills Required in Cognitive Learning
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2.0 INTRODUCTION

Learning constitutes one of the most significant achievements of a person's life. However, learning is dependent on a lot of factors and one of them is the process of assessment. Assessment can contribute to learning in a variety of ways and is of paramount importance for teachers, students and academicians. Assessment of learning focuses on the ways students can be assessed so as to improve the learning process.

In this unit, the three dimensions of learning—cognitive, affective and psychomotor—are discussed. Besides this, you will learn about how these three types of learning are assessed.

2.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Explain the cognitive domain and how its objectives are formulated and assessed
- Discuss the affective domain and how its objectives are formulated and assessed
- Describe the psychomotor domain

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2.2 EDUCATIONAL OBJECTIVES AND THEIR CLASSIFICATION

The study of classification is known as taxonomy. You have various objectives of education related to personal needs, social needs, community needs, national needs, global needs, and various aspects to your personality. The first and the most successful effort in this direction was made by American educational psychologist Benjamin Bloom and his co-worker, who began their work in 1948. Bloom was teaching educational psychology at the University of Chicago. He developed and proposed the classification of educational objectives in 1956, which is popularly known as Bloom's Taxonomy of Educational Objectives. This is the classification of the different aims and objectives, which are required to be achieved through curriculum of any course and involves knowledge, skills, attitude values and abilities that a teacher, teacher educator or curriculum developer sets for students as teaching-learning objectives. This classification fits properly for all subjects and courses whether academic or technical. In all the areas of study, you try to develop content knowledge and understanding, skills, and values related to it. You will find these in the classification of educational objectives by Bloom.

Bloom's taxonomy of educational objectives also fits properly with Mahatma Gandhi's views on education. Mahatma Gandhi defines education as, 'By education, I mean the all-round drawing out the best in child and man-body, mind and soul'. Gandhi's definition remarkably reflects the idea that education should develop the whole personality of the child by developing the three most important dimensions of personality, i.e., body, mind and soul. Mind indicates intellectual aspects; soul indicates the emotional, spiritual and moral aspects; and body indicates the development of skills which requires the use of body parts like fingers, hands, legs, eyes, vocal cord etc., for performing various skills.

Bloom classified educational objectives into three 'domains', namely: (i) cognitive domain, (ii) affective domain (iii) psychomotor domain, as shown in Figure 2.1.

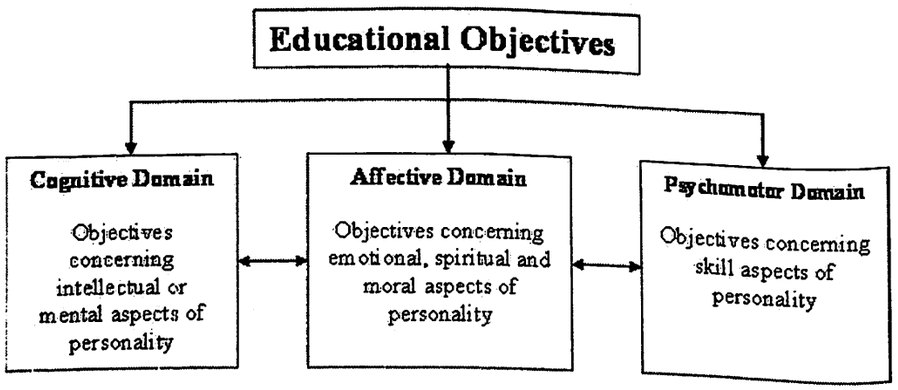


Fig. 2.1 Domains of Educational Objectives

All the three domains are not divided entirely by a water tight compartment. Each of the three domains is interrelated and achievements in one domain influence the achievement by other domain. However, all domains develop in a hierarchical order and constitute the whole personality of an individual. If an individual develops his or her three domains in any area of study, he or she is having a good personality, and if any one domain is underdeveloped, then he or she has not nurtured himself or herself as a groomed personality. Hierarchical means of learning at the higher level in any domain is entirely dependent on having acquired prerequisite knowledge and skills at lower level. The three domains may be represented in short as:

1. Cognitive domain (about knowing-intellectual aspects of personality of an individual)
2. Affective domain (about attitudes, feelings, interests, values and beliefs of an individual)
3. Psychomotor domain (about doing-skill aspects of the personality of an individual)

All the three domains have their own taxonomy or classification. In all domains, the levels of expertise or abilities are arranged in order of increasing complexity, i.e., in hierarchical order of difficulty levels. Learning outcomes that require higher levels of expertise require more effective teaching and more sophisticated classroom techniques and method of teaching.

Dimensions of learning basically form a framework of learning focused on preparing instructional planning, keeping in view cognition (the awareness part) and learning in practical classroom situations. This framework serves three major purposes. These are as follows:

1. It provides a process for planning and delivering curriculum and instruction that integrates much of the research on effective teaching and learning.
2. It offers a way of integrating the major instructional models by showing how they are connected and where the overlaps occur.
3. It provides a framework for organizing, describing and developing research-based teaching strategies that engage students in the types of thinking that can lead to meaningful learning.

The following five aspects of learning should be considered while finalizing curriculum, instruction and assessment:

- Attitudes and perceptions about learning
- Using knowledge meaningfully
- Identifying productive habits of the mind
- Acquiring and integrating knowledge
- Extending and refining knowledge

2.3 COGNITIVE DOMAIN

Cognitive domain includes those objectives of education which attempt to develop mental faculties or intellectual abilities, i.e., the ability of knowing, understanding, thinking and problem solving. It develops our factual knowledge, conceptual understanding and all levels (lower, middle and higher) of thinking. It covers whole of mental abilities and mental operations.

Check Your Progress

1. What is Bloom's Taxonomy of Educational Objectives?
2. List the domains of educational objectives.

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2.3.1 Classification of Cognitive Domain

The classification of cognitive domain was done in 1956 by Bloom and is commonly known as Bloom's Taxonomy of Cognitive Domain (Bloom et.al, 1956). Cognitive taxonomy or classification of cognitive domain has knowledge-based goals. This domain has been classified into six major categories which are arranged in a hierarchical order based on the levels of complexities of cognitive or mental or intellectual tasks or operations. These are arranged from simple to complex and concrete to abstract starting from category one to category six, respectively.

1. **Knowledge:** This is the first and the lowest level of cognitive domain. It represents memory and constitutes recall and recognition of various facts, concepts, principles, theories and laws of physical science. No addition or deletion is done in this category; we simply recall and recognize things. In the revised Bloom's taxonomy, this category is given new name 'remembering'.

   Example: The symbol of iron is 'Fe'.

   The chemical formula of sulphuric acid is 'H_2SO_4'.

   Laws of motion were given by 'Isac Newton'.

   A magnet has two poles– N (north) and S (south)

2. **Understanding:** This is the second level of cognitive domain and develops only after the development of the first category, i.e., knowledge or remembering in any particular area of study, also in physical science. Learners are expected to go beyond the level of recall and recognition. After having developed this level of understanding on any topic, learners become capable of doing the following major tasks, which in turn indicates that the learners have acquired the level of understanding in a given topic:

   (i) Translate, summarize or define the acquired knowledge in their own words.

   (ii) Describe, elaborate, extrapolate and explain natural phenomena or events or process or method, etc.

   (iii) Interpret the acquired information or knowledge in their own way and give their own examples. They can discriminate or differentiate between two or many objects or concepts. Classify and categorize various objects into groups on the basis of some criteria. Verify and generalize facts and concepts.

   Example: After having understood the structure of atom, learners not only recall protons, electrons and neutrons but also describe the structure of an atom. Now learners can also explain why an atom is neutral with the help of charges acquired by every fundamental particle and numbers of all three particles in an atom.

3. **Application:** After having acquired knowledge and understanding levels of any topic (may be a fact, concept, principle, theory or law), learners should be able to apply them in their day-to-day lives. Application of any concept, principle, theory or law in daily life and solving problems of varied nature is impossible without its knowledge and understanding. Unless the learner is able to apply whatever knowledge and understanding he or she has acquired, it has no meaning at all and indicates that the learners have not understood the content properly. by applying or implementing the gained knowledge and understanding of various contents, you can solve many problems of daily life, under concrete and abstract situations.

   Example: If learners know and understand the importance of natural resources, underground water crisis, electricity supply and demand relationship and other such problems of daily lives, they will take care of these things in their day-to-day life, and by applying this understanding, they will try to minimize wastage of water and electricity in their homes, schools and society by proper and judicial use of these things.

4. **Analysis:** This is the fourth higher level category of cognitive abilities. At this stage, learners develop the potential to analyse and breakdown the whole into its various components or constituents and detect the relationship and organization of its various components. Learners develop the ability to break a law and theory into its various inherent facts, concepts and principles on the basis of which that theory or law has been created or proposed.

   Example: Learners are taught about the laws of motion. Suppose they know and understand the third law of motion which states, 'to every action there is an equal and opposite reaction'. They have also developed the ability to apply this knowledge and understanding in their daily lives. If the analytical ability has developed, they would be able to analyse this law in the event of some likely situations. They would also be able to describe its every concept like action and reaction. One can analyse anything if he or she has knowledge and understanding of that thing and also has the potential to apply it. In the process of analysis, three tasks are performed in general. These are as follows:

   (a) Analysis of elements or constituents making the whole

   (b) Analysis of relationship among various constituents

   (c) Analysis of the organizational patterns of the constituents

5. **Synthesis:** This is the process of putting together of various constituents to make a whole. This is a higher level thinking ability and is complex in nature, which involves the creation of a new pattern or structure by manipulating various constituents. It has the elements of creativity attached with it. Development of creative personality requires this level of cognition to be achieved by the learners. All creative people have this ability in common. Synthesis involves the following three things:

   - Development of a unique communication
   - Development of a plan, procedure or proposed set of operation
   - Development of a set of abstract relations

6. **Evaluation:** This is the process of judgment about the worth or value of a process or a product. It includes all the content, i.e., facts, concepts, principles, theories and laws of physical sciences. It is the highest and the most complex level of cognitive ability and involves all the five categories discussed earlier. It is a quantitative as well as a qualitative process. It leads to the development of decision-making ability among the learners and involves judgment in terms of internal as well as external criteria.

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2.3.2 Assessment of Cognitive Learning

Cognitive learning is defined as the acquisition of knowledge and skills by the mental process. Cognition includes representation of physical objects and events and other information processing.

The cognitive learning is a result of listening, watching, touching or experiencing. Cognitive learning is mainly awareness towards the environment—the environment that provides some meaning to acquired knowledge.

After these activities, it is important to process and remember the information. No motor movement is needed in cognitive learning and the learner is active only in a cognitive way. Cognitive learning includes symbols, values, beliefs and norms.

When we say the word 'learning', we usually mean 'to think using the brain'. This basic concept of learning is the main viewpoint in the Cognitive Learning Theory (CLT). The theory has been used to explain mental processes as they are influenced by both intrinsic and extrinsic factors, which eventually bring about learning in an individual.

CLT implies that the different processes concerning learning can be explained by analysing the mental processes first. It posits that with effective cognitive processes, learning is easier and new information can be stored in the memory for a long time. On the other hand, ineffective cognitive processes result in learning difficulties that can be seen anytime during the lifetime of an individual.

Insight and motivation

In CLT, motivation and purpose are much the same. The learner's goal is the end result he anticipates and desires. The goal controls the behaviour of the learner. The teacher's most important responsibility is to help the learner find worthwhile goals which may be clear and realistic. They should recognize and use the prominence of social and achievement motives in school learning. The teacher must know about what is familiar to students and then he must introduce elements of novelty but not too rapidly. A good teacher must pace his presentation to maintain the interest and attention in learning.

The teachers' management of conflicting motives may be an important factor in student's success.

Guiding exploration and action

The cognitive theorists in teaching of reading begin with thoughts interesting and understandable to the learner. In every type of instruction, we start with meaningful wholes.

- An attempt is made to focus attention on elements and relationship that determine the correct response.
- Teachers' guidance must match the students' level of thought or ways of working. If a student has not advanced above the level of concrete thinking, information presented symbolically will not help him.
- The teacher can help students to find purpose or order in learning.

The formation of concepts may be regarded as the organization of experience. The teacher's role is to use appropriate means to clarify the critical features of both old and new experiences.

2.3.3 Thinking Skills Required in Cognitive Learning

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The following critical thinking skills are required in cognitive learning:

1. Convergent thinking

Convergent thinking is a term introduced by American Psychologist Joy Paul Guilford. It generally means the ability to give the 'correct' answer to standard questions that do not require the utilization of much creative faculty. Divergent and convergent thinking skills are both important aspects of intelligence, problem solving and critical thinking. Bringing facts and data together from various sources and then applying logic and knowledge to solve the problem to achieve an objective is known as convergent thinking.

Assessing convergent thinking: Convergent thinking can be assessed by administering standard IQ (Intelligent Quotient) tests, by various recognition or knowledge tests, logical discussions and by giving some problems to the students.

2. Divergent thinking

Divergent thinking is thinking outwardly instead of inwardly. It is the ability to develop original and unique ideas and then come up with a solution to a problem or achieve an objective.

The goal of divergent thinking is to generate many different ideas about a topic in a short period of time. It involves breaking a topic down into its various component parts in order to gain insight into the various aspects of the topic. Divergent thinking typically occurs in a spontaneous, free-flowing manner, such that the ideas are generated in a random, unorganized fashion.

Self analysis

The following questions may help to find out the potential of a learner:

- What are my activities during a normal day?
- What do I know about?
- How do I spend my time?
- What are my areas of expertise?
- What would I like to change in my world or life?
- What are my strongest beliefs and values?
- What am I studying in school?
- What bothers me?
- What do I like? What are my hobbies? What are my interests?

Topic analysis

The following questions may help in refining a large topic into a specific, focused one:

- What are the most important aspects of some specific things?
- What are the effects of a thing?
- How has an object changed? Why are those changes important?

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- What are the different aspects of anything you can think of?
- What are the smaller parts that comprise an object?
- What do I know about a thing?
- What suggestions or recommendations can be made about that thing?
- Is something good or bad? Why?

Techniques to stimulate divergent thinking

The following are some of the techniques used to stimulate divergent thinking:

- **Brainstorming:** This is a technique which involves generating a list of ideas in a creative, but unstructured manner. The goal of brainstorming is to generate as many ideas as possible in a short period of time. All ideas are recorded during the brainstorming process.
- **Recording ideas:** By recording ideas, one can create a collection of thoughts on various subjects that later becomes a source book of ideas.
- **Free writing**: The idea is to write down whatever comes to mind about the topic, without stopping. This can help generate a variety of thoughts about a topic in a short period of time.
- **Mind or subject mapping**: This involves translating brainstormed ideas into the form of a visual map or picture.

3. Critical thinking

Critical thinking is described as reasonable reflective thinking focused on what to believe and what not to believe. It is that mode of thinking — about any subject, content, or problem — in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them. Michael Scriven, british polymath and academic, and Richard Paul, an internationally recognized authority on critical thinking, believe that critical thinking is the intellectually disciplined process of:

- Analysing the situation
- Synthesizing two or more pieces of information
- Applying knowledge
- Active and skilful conceptualization
- Evaluating gathered information based on certain universal intellectual values

***Characteristics of critical thinking*:** It comprises various modes of thinking, such as scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking and philosophical thinking. The following are its four characteristics:

1. It is self-guided, self-disciplined thinking which attempts to reason at the highest level of quality.
2. Critical thinking of any kind is never universal in any individual; everyone is subject to episodes of irrational thought.
3. It is affected by the motivation.

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4. Critical thinking can be seen as having two components: (a) a set of information and belief generating and processing skills, and (b) the habit, based on intellectual commitment to use those skills to guide behaviour.

***Importance of critical thinking skills*:** Critical thinking skills are essential to:

- Learn how to approach problems logically and confidently
- Balance using both the right and left sides of the brain
- Make wise decisions in life
- Put oneself on the path to knowledge

The list of core critical thinking skills includes observation, interpretation, analysis, inference, evaluation, explanation and meta-cognition. There is a reasonable level of consensus among experts that an individual or group engaged in strong critical thinking gives due consideration to the procedure involved.

Critical thinking calls for the ability to:

- Recognize problems
- Find workable means to solve those problems
- Comprehend and use the text with accuracy and clarity
- Interpret data to evaluate arguments
- Recognize unsaid assumptions
- Understand the importance of steps in problem solving
- Collect relevant information
- Recognize the existence (or non-existence) of logical relationships between propositions
- Draw conclusions
- Cross-check conclusions

4. Problem solving

Problem solving is a mental process that involves discovering, analysing and solving problems. The ultimate goal of problem-solving is to overcome obstacles and find a solution that best resolves the issue.

Formalized learning theory developed in late 1930, when proponents of various approaches attempted to build their own theory to explain the problems of learning. A theory of learning cannot be defined to satisfy all interested persons. We can quote the definition of a theory as 'a provisional explanatory proposition or set of propositions, concerning some natural phenomena and consisting of symbolic representations of: (a) the observed relationships among independent and dependent variables, (b) the mechanisms or structures presumed to underlie such relationships, or (c) inferred relationships and underlying mechanisms intended to account for observed data in the absence of any direct empirical manifestations of the relationships' (*Learning Theories* edited by Melvin H. Marx).

Approaches to problem solving

Traditionally, two different approaches have been mentioned by psychologists, adhering to two families of learning theories: (a) cognitive field theory, and (b) stimulus-response theory.

Cognitive field theory emphasizes the importance of perception of total situation and relationship among its components, and restructuring the cognitive field. German Psychologist and Phenomenologist Wolfgang Köhler conducted his classical experiments on a chimpanzee named Sultan to study the process of problem solving in animals. He, from his study on problem solving, proposed that solution of a problem is arrived at, all of a sudden, after some initial efforts by the individual. Many studies have been conducted on children and adults which confirm that solution of a problem is reached, all of a sudden, through insight into the situation.

The second point of view has been advanced by stimulus-response theorists who emphasize the importance of trial and error. They hold that a problem is solved through a gradual process of elimination of errors and putting together correct responses. There has been considerable controversy as regards the superiority of one approach over the other as an interpretation of problem solving. Some psychologists are of the opinion that cognitive field theory, approach is most effective for solving problems which require higher mental processes, while stimulus-response approach is effective for solving simple problems.

To do away with the controversy of cognitive and stimulus response theorists' approach, American psychologist Harry Harlow (1959) proposed a third explanation. His approach is more realistic and rational in nature. He conducted a series of experiments on monkeys and human subjects of low mental abilities. He presented his human subjects with simple problems of discrimination. He observed that in the beginning, his subjects showed trial and error behaviour to solve a series of problems, but he noticed that when similar problems were presented to the subjects in future for the first time, they made correct discrimination. The later stage appears to be insightful learning, that is, suddenly getting the problem solved. According to Harlow, the underlying assumption is that in the previous trial and error learning, the subjects have learned 'how to learn'. They acquired what he called a learning set. They acquired a method of learning that transferred positively to other problem situations of similar type.

Harlow says, 'Generalizing broadly to human behaviour, we hold that original learning within an area is difficult and frustrating, but after mastery of the basic facts, learning within the same area becomes simple and effortless.'

The steps in problem solving

In order to correctly solve a problem, it is important to follow a series of steps. Many researchers refer to this as the problem-solving cycle, which includes developing strategies and organizing knowledge. The following are the steps required in the process of problem solving:

1. **Identifying the problem:** While it sounds like the simplest thing to do, it actually is not. It is very common for people to identify the reason incorrectly, which obviously renders all following efforts useless.
2. **Defining the problem:** Once the problem has been correctly discovered, the next step is to define it. Defining the problem carefully offers solutions and insights into the problem.
3. **Forming a strategy:**Next, a strategy must be devised which would be as per the individual's mindset, attitude, experience and available resources.
4. **Organizing information:**The strategy should ideally lead to a solution, but first, the information needs to be organized in a coherent manner, such that it leads naturally to the best possible solution.
5. **Allocating resources:** It is good to allocate more resources to solve a problem, so that the available resources can be used to find out a solution.

Problem solving techniques

These techniques are usually called problem-solving strategies. These are as follows:

- **Brainstorming:** Suggesting a large number of solutions or ideas and combining and developing them until an effective solution is found
- **Abstraction:** Solving the problem in a model of the system before applying it to the real system
- Assessing the output and interactions of an entire system
- **Lateral thinking:** Approaching solutions indirectly and creatively
- **Dividing and conquer:** Breaking down a large, complex problem into smaller, solvable problems
- Employing existing ideas or adapting existing solutions to similar problems
- **Analogy:** Using a solution that solved an analogous problem
- **Hypothesis testing:** Assuming a possible explanation to the problem and trying to prove one's perspective
- Synthesizing seemingly non-matching characteristics of different objects into something new
- Transforming the problem into another problem for which solutions exist
- Eliminating the cause of the problem
- Testing possible solutions until the right one is found

5. Decision making

Decision making can be regarded as the mental processes resulting in the selection of a course of action among several alternative scenarios. The end result of each decision making process is a final selection. The output can be an action or a suggestion.

Steps in decision making

The following are the steps that are to be followed in the decision-making process:

- Objectives are to be established first.
- Objectives must be classified and placed in the order of importance.
- Alternative actions must be developed.
- The alternative must be evaluated.
- A tentative decision can be made.
- The tentative decision is evaluated and analysed.
- Few steps are followed that result in a decision model. This can be used to determine an optimal plan.
- In a situation of conflict, role-playing can be used.

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Each step in the decision-making process may include social, cognitive and cultural problems. It has been suggested that becoming more aware of these obstacles allow one to better anticipate and overcome them. The following few steps can help in establishing good decision making:

- Creating and nurturing the relationships, norms and procedures that will influence how problems are understood and communicated.
- Recognizing that a problem exists.
- Identifying an explanation for the problem and evaluating it.
- Finding more suitable justice among many responses.
- Following through with action that supports the more justified decision. Integrity is supported by the ability to overcome distractions and obstacles, developing implementing skills and ego strength.

Decision-making stages

There are four stages that are involved in all group decision making. These stages, or sometimes called phases, are important for the decision-making process to begin. These were developed by communication researcher B. Aubrey Fisher. The four stages are as follows:

1. **Orientation stage**: This is introductory stage, when members meet for the first time and get to know each other.
2. **Conflict stage**: Once group members become familiar with each other, disputes, little fights and arguments take place. Nevertheless, group members eventually work it out.
3. **Emergence stage**: The group begins to clear up vague opinions by talking about them.
4. **Reinforcement stage**: Members finally make a decision, while justifying to themselves that it was the right decision.

2.4 AFFECTIVE DOMAIN AND FORMULATION OF SPECIFIC OBJECTIVES

Check Your Progress

3. Name the various categories of cognitive domain.
4. Define convergent thinking.
5. What do you understand by the term problem solving?
6. List the first two steps in decision making.
7. Name the four decision-making stages.

The affective domain of Bloom's taxonomy of educational objectives is related to the development of emotions, values, attitudes, and the development of those aspects of personality which are more influenced by heart than the mind. It also includes the development of interests, appreciation, feelings, likes and dislikes towards something.

2.4.1 Classification of Affective Domain

The classification of this domain was done by American educational psychologists D. R. Krathwohl, B. S. Bloom and B. B. Masia in 1964. The categories in this domain are also arranged hierarchically from the lowest to the highest level of complexity.

1. **Receiving:** This is the ability, inclination and readiness of learners to receive information. It requires attention, awareness, listening, seeing and willingness on the part of the learners. These are preconditions of learning, personality development, and imbibing culture and values. It needs sensitization of learners to stimuli, phenomena or environment. On the whole, learners should be made receptive in their habit and attitude. Whatever you want learners to learn, you should make them receptive toward those things.

   Examples:

   - Reading newspapers, magazines, journals, books, reports, etc., of interest to the learner
   - Watching news, shows, reports, programmes as per interest
   - Listening patiently and attentively to teachers, parents, seniors, friends and more experienced persons
   - Having curiosity to learn from various sources

2. **Responding:** This is the second level objective under affective domain. Learners are required to be responsive along with being receptive; otherwise it will not serve the purpose. Responding behaviour reflects that the learners are receiving or trying to receive. Continuity in attention and motivation behaviour (receiving) leads to the development of responding behaviour.

   This category of ability is represented by interest, which is the tendency to respond to a particular object or event or situation. This creates the way for two-way communication and facilitates the process of teaching and learning. Students 'listen' to the teachers attentively and 'respond' to them to give their reflection and share their experiences.

   Example:

   - Response of students in class
   - Interaction of students with teachers, friends and seniors on various issues or problems
   - Visit to clubs, libraries, museums and other knowledge resource centres
   - Participation in various activities, competition, seminars, conferences, cross word and such other programmes

3. **Valuing:** During the cyclic process of receiving and responding, learners are automatically inclined towards taking value judgment regarding the things they are concerned with. These things may be an object, an event, an idea, a rule, any ritual, a set norm or any traditional or modern aspects of our culture. Through the process of valuing, individuals set guidelines for regulating their own behaviour. Character formation or value inculcation in the growing generation is done through the following three sequential steps:

   (a) Value acceptance

   (b) Value preference

   (c) Value commitment

   Example: A class is taught by several teachers. All teachers practice various values in which some are common and some are unique for individual teachers. Students attend their classes and interact with them. They observe and analyse various values being practiced by their teachers. Through regular observation and analysis, students develop their own value based on their preference, acceptance and commitment.

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4. **Organization:** Through the process discussed above, students absorb various values from their teachers, parents and society. They analyse various values absorbed from different sources and finally construct relatively enduring value system through the process of synthesis and organization of values for a balanced conduct and behaviour pattern. This leads to the development of a set value structure or philosophy of life for every individual. It assists individuals in decision-making process about conduct in real life situations and in forming opinions on major issues of social and personal concern.
5. **Characterization of values or value complex:** This is the highest level category of objectives under affective domain. At this level, individuals develop a set of values, attitudes and beliefs for themselves that build their character and give shape to their philosophy and personality. This process goes on continuously throughout life resulting into the shift of preference of various values, depending upon situation, age and experience.

2.4.2 Assessment of Affective Learning

The affective domain given by Krathwohl, Bloom and Masia includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasm, motivations and attitudes. The five major categories are listed from the simplest behaviour to the most complex in Table 2.2.

Table 2.2 Five Major Categories Describing the Affective Domain

Category	Key Words (Verbs)
1. **Receiving phenomena** (Awareness, willingness to hear)	Asks, choose, describe, follow, give, identify, locate, name
2. **Responding to phenomena** (Active participation on the part of the learners. Attends and reacts to a particular phenomenon)	Answer, assist, aid, complie, conform, discuss, greet, help, perform, practice, present, read, recite, report, select, tell, write
3. **Valuing** (Valuing is based on the internalization of a set of specified values, while clues to these values are expressed in the learner's overt behaviour and are often identifiable)	Complete, demonstrate, differentiate, explain, follow, form, initiate, invite, propose, read, report, select, share, study, work
4. **Organization** (Organizes values into priorities by contrasting different values, resolving conflicts between them, and creating a unique value system)	Adhere, alter, arrange, combine, compare, complete, defend, explain, formulate, generalize, identify, integrate, modify, order
5. **Internalizing values** (characterization): Has a value system that controls their behaviour	Act, discriminate, display, influence, listen, modify, perform, practice, solve

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2.4.3 Attitude and Values

'An attitude can be defined as a positive or negative evaluation of people, objects, events, activities, ideas, or just about anything in your environment.'

—Philip George Zimbardo, 1999

In the opinion of American sociologist Read Bain, attitude is 'the relatively stable overt behaviour of a person which affects his status'. An attitude is a state of mind or a feeling or disposition. It is important to have a positive attitude about work.

Values

Affective learning also involves internalizing a set of values expressed in behaviour. Teachers affect the values and behaviour in a student by setting examples by their own behaviour.

Attitude formation

Attitudes are expected to change as a function of experience, environment and education. American psychologist Abraham Tesser has argued that hereditary variables may also affect attitudes.

Measurement of attitude

A number of techniques for measuring attitudes are in use. However, they all suffer from different kinds of limitations. Largely, the different types of techniques focus on the components of attitudes, namely the cognitive, the affective and the behavioural components. The two basic categories that attitude measurement methods can be divided into are as follows:

1. Direct measurement, such as Likert scale
2. Indirect measurement, such as projective techniques

Direct observation

This is a simple and logical method which records the behaviour patterns of people under study. This method is widely used for various purposes. However, even if the individuals to be studied are easily accessible, observing the behaviour of a large sample of individuals is not practically feasible.

Direct questioning

This method involves asking pre-set questions on certain topics on which the individual's behaviours are to be evaluated. While it seems like the most straightforward approach to simply ask questions to test attitude, the results may not be accurate because an individual may try to hide his or her real opinions and attitudes.

Some other approaches

In projective techniques, attitude gauging objects are hidden and results are interpreted on the basis of pre-set criteria. While this technique overcomes some limitations of the direct observation technique, the projective technique falls short when it comes to objective and reliable interpretation of data.

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Thurstone scale

The first official method for measuring attitude was formulated by Louis Leon Thurston, a US pioneer in the fields of psychometrics and psychophysics, in 1928. His objective was to measure people's attitudes regarding religion. The Thurstone scale contains statements regarding the issue in question and every statement is assigned a numerical value based on the value the evaluator considers it to have. When people have selected the statements for each question, the values are added up and the average is calculated, which corresponds to a particular attitude.

Likert scale

Likert introduced the Likert scale of attitudes in *A Technique for the Measurement of Attitudes*. The scale covered a range of attitudes, from extremely positive to neutral to extremely negative. This scale also consists of statements and the subjects are asked to express their opinion regarding the statement through a 0–5 point scale. Once each statement has been assigned a numerical value, again they are added up and the mean is calculated. This kind of scale is often used in career assessment programmes to gauge a learner's interests and tendencies, so that they can help themselves select the right career path.

The Likertscale is applied in the form of questionnaires. A Likert scale questionnaire would contain a statement, which would need to be evaluated by theindividual on the basis of the following kind of responses:

(a) Strongly disagree

(b) Disagree

(c) Neither disagree nor agree

(d) Agree

(e) Strongly agree

The individual will tick or circle one response for each statement or question. Each statement/question and its possible responses are together known as a Likert item. A Likert scale is, in turn, a sum of responses to multiple Likert items. A Likert scale is considered a 'balanced' form of attitude testing because it contains an equal number of positive and negative options.

In some cases of Likert scale questionnaires, the neutral response, such as 'neither disagree nor agree', is removed. Such an evaluation method is known as the forced choice method, because the individual cannot remain neutral on any statement. The forced choice method is used when it is thought that the individual might select the neutral response to avoid controversy or hide ignorance.

Generally, three kinds of common biases may render Likert scale questionnaires unreliable. These are as follows:

- **Central tendency bias:** In a professional setting especially, the individual may be reluctant to admit strong feelings about an issue.
- **Acquiescence bias:** The individual may feel obliged to agree with the presented statement.

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- **Social desirability bias:** The individual may select an option to preserve the self-image or to be popular.

Once the respondent gives in the complete questionnaire, the responses may be evaluated individually or in a grouped form, depending on the pattern being studied. When studied in a grouped form, the items provide a score, which can be categorized and evaluated. The Likert scale is also sometimes known as the Summative Scale.

Interest and its measurement

The reason for finding out the interest of the students is to help them in getting their dream careers. This inventory helps the teachers in knowing the interest areas of their students so that they can encourage and get various opportunities to grow in a particular field.

Thus, an interest inventory is often used in career assessment. The goal of this assessment is to give insight into the students' interests, so that they may face less difficulty in deciding on an appropriate career choice for themselves. It is also frequently used for educational guidance as one of the most popular career assessment tools. The test was developed in 1927 by psychologist E. K. Strong to help people who were quitting the military jobs to find suitable jobs.

Supporting students

Prior to selecting a career, students need to identify the right path for themselves. This can be done through an assessment, which would help them get an insight into their own interests, preferences and personal styles. Analysing these aspects will direct them into identifying the right courses, jobs, internships and activities that are suitable for them.

Self-concept and its assessment

Self-concept defines how we assess ourselves as individuals or what we think of ourselves. Self-concept is a commonly used term. There are two aspects to the development of self-concept. These are as follows:

1. **The existential self:** This aspect of the self can be defined as,'the sense of being separate and distinct from others and the awareness of the constancy of the self'. (Bee 1992)
2. **The categorical self:** Once a child realizes that he hasa distinct identity, hegradually become aware of the world around him and his own place in the world. He starts relating to the world and starts thinking of himself as more than hisphysical characteristics, such as hair colour or height, etc. Finally, he becomes aware of the fact that others perceive himin a certain way, which may or may not be similar to how he perceives himself.

According to American psychologist Carl Rogers, self-concept has three different components. These are as follows:

1. The view you have of yourself (self-image)
2. How much value you place on yourself (self-esteem or self-worth)
3. What you wish you were really like (ideal self)

Factors affecting self-concept

The following factors affect self-concept:

1. **How others react to us:** People's approval and recognition and affection helps to develop a positive self-image.
2. **Comparison with others:** Comparing oneself with people who seem to be doing better financially or more popular socially than oneself can lead to a negative self-image. However, if the comparison is made with people who are less successful, it would lead to a positive self-image.
3. **Social roles:** There are some roles that are associated with prestige and positive self-image, such as that of a doctor.
4. **Identification**: Self-concept is also influenced by the role we play in the group that we belong to.

2.5 PSYCHOMOTOR DOMAIN

Psychomotor domain is concerned with those objectives which are intended to develop various skills. For example: typing, painting, drawing, dissecting, preparing food, beautification, carpentry, book binding, sculpture, photography, operation of computer or any other machine, working with any tools to produce something. It includes all manipulative skills. For any motor activity or skill work, psychological readiness is an essential condition. If a person is psychologically ready, he or she will also be mentally ready and will act towards the desired, skilled work.

2.5.1 Classification

Psychomotor domain is classified by many psychologists. Some of them are Ragole (1950), E. J. Simpson (1966), J. P. Guilford (1958), R. H. Dave (1969), A. J. Harrow (1972), Allyn & Bacon (1994). In the following paragraphs, we are going to discuss the classification given by R. H. Dave (1969) in an adapted form. There are five categories under this domain, arranged from 1 to 5 in the order of increasing complexity, difficulty level and fineness in the skill being developed.

1. **Initiation-observation or observation-initiation:** For learning any skill (simple or complex), learners need psychological readiness. It is common to most of the learners that they hesitate of any skilled work at the time of beginning. They generally hesitate to take initiative. Contrary to this, there are some learners who are highly motivated to start as they have observed somebody doing it and they are highly motivated to perform that skill.

   If learners are not interested or motivated, they need to become motivated by means of promise of some reward, discussion, fulfillment of some desires and aspirations of the learners, etc. In the above case, 'initiation' is the first step towards the development of skill. On the other hand, if a learner has observed some person performing some skill and is highly motivated and encouraged to do that skill, then he takes initiative automatically. In this case, observation is followed by initiation.

Check Your Progress

8. What is affective domain?
9. Give the definition of attitude as given by psychologist Philip George Zimbardo.
10. Name the two ways in which attitude can be measured.
11. Name the two scales that can be used to measure attitude.
12. Why is it so important to measure the interest of the students?
13. For what purpose did E. K. Strong devise a way to measure interest?
14. Define self-concept.

2. **Manipulation:** When the learner is ready to take initiative, he observes others performing that skill and sees how performers are manipulating tools required in that skill and he also starts manipulation of those tools to produce or copy that skill. Manipulation and observation work together continuously for quite some time. As a result, improvement in performance is achieved and it leads towards perfection. During this process, learners perform the following three tasks:
   (i) Perform selected steps
   (ii) Follow directions
   (iii) Fix their performance through necessary practice
3. **Precision:** Repeated observation of the expert performers and continuous practice leads learners to the performance of the skill with a desired level of precision, i.e., accuracy and exactness. They reach at a higher level of refinement. They achieve this level through the following points of consideration:
   - Controlling faults
   - Eliminating errors
   - Reproducing the desired skill with precision
4. **Articulation:** This is the level at which learners bring some novel attributes or features to their skill performance in addition to the general attributes.
5. **Naturalization:** This is the highest level of performance in skill development. The act of the performer becomes automatic or natural. Achiever of this level of proficiency, which is rare, performs with the highest degree of refinement and convenience as natural as possible. For performer as well as audience or observer, it looks like an effortless performance.

2.5.2 Assessment of Performance or Psychomotor Learning

Performance assessments are designed to judge a student's abilities to use specific knowledge and research skills. Most performance assessments require the student to manipulate equipment to solve a problem or make an analysis. Rich performance assessments reveal a variety of problem-solving approaches, thus providing insight into a student's level of conceptual knowledge.

Performance assessment is a form of testing that requires students to perform a task rather than select an answer from a ready-made list. Experienced teachers or other trained staff then judge the quality of the student's work based on a pre-decided set of criteria. This new form of assessment is most widely used to directly assess writing ability based on the text produced by students under test instructions.

How does it work?

The student's work is assessed by teachers or other staff on the basis of pre-set criteria. The teachers assess the student's learning abilities when given specific instructions. It is important to understand how the assessment works. The following methods have been used successfully to do so:

- **Open-ended answers:** The student has to come up with the answer independently after some degree of analysis, either orally or in writing. No

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options are given and the students are usually asked to discuss their observations about some material given to them.

- **Extended tasks:** In this kind of assessment, the student is required to research, draft and revise and come up with a well-though out analysis of the given problem. It is like an assignment or a project. It may take the student many hours to complete.
- **Portfolios:** They are pictorial descriptions of the student's past work and the teacher's evaluation of it. Usually, portfolios include a person's best work and some work in progress which showcases the student's strengths.

What is common among all these methods is that they are all specific tasks completed by the student according to the instructions from the teachers and the students are made well-aware of the standards expected from them. They are also aware that the teachers will be grading them based on their work. This aspect renders performance assessment distinct from other testing methods.

Purpose of assessment

Performance assessments evaluate a student's work and assess how well the student is able to apply the learned concepts. Assessments may be of different types—some may require the student to replicate a procedure learnt in class, some may require simple recall or even intricate analysis.

A limitation of performance assessments is that such assessments may not turn out to be suitable for simply testing the knowledge of facts.

Teaching goals of performance assessment

Performance assessment helps the student to:

- Apply systematic procedures
- Make use of resource texts, laboratory equipment and computers
- Use scientific methodology
- Evaluate and apply several approaches
- Work out difficult problems

The three main purposes of performance assessments are as follows:

1. **Diagnostic purposes:** The assessment is expected to diagnose the students' knowledge about solving specific categories of problems.
2. **Instructional purposes:** A well-crafted assessment can also be used for instructional purposes, except for the fact that it is standardized and graded.
3. **Monitoring purposes:** Since assessments are undertaken at regular intervals, it is very useful for tracking a student's levels of learning, especially in subjects like science and mathematics, which signifies a student's skills of problem solving.

This methodology is revolutionary, in the sense that it is not just about testing, but also about the learning process. In this methodology, students are encouraged to think and create the finished product, during the course of which they are automatically testing their skills and knowledge.

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Unlike the old model of teaching where students were tested after each lesson or unit was covered in the classroom, here the approach is to use the book knowledge merely as a resource or means to an end, and not the end itself.

Let us study a relevant example to understand performance assessment better. If a coach assembles 11 players and tells them all the rules of the game of cricket, the spirit in which the game must be played and the dangers of playing without protective padding, will not make them world champions. The players need to go and play an actual game. The performance assessment method involves students 'playing the game'. This way, what goes on in the class is actual preparation for life after school.

Typically, a performance assessment activity can be broken down into the use of the following skills:

1. **Obtaining information:** Students would need to research, compile and organize information as per the specified goal.
2. **Employing the information:** After they have organized the information, they will need to work with it or infer, sequence, analyse and synthesize it to create something new.
3. **Use the information:** When they have the information in the required form, for example, a flowchart, they can use it to convince a target group, or simply present ideas and concepts.
4. **Communication:** Making presentations, oral and visual, doing projects and demonstrating skills is all a part of communicating with others. When a student or a group of students presents their ideas in any form to others, they are automatically honing their communication skills.

Here are the key benefits of employing the performance assessment methodology:

1. **The variety of tasks call for use of various learning styles and skills:** Each student has a core competency, which simply put, means a skill they have more refined than others. Someone may be good at writing descriptive book reports and someone else may be proficient at making Powerpoint presentations. Some learners are exceptional at organizing information and still others may be brilliant speakers, and so on. Not only does performance assessment allow students to display their particular skills, it also encourages them to acquire new ones. For example, a student who likes writing detailed, informational pamphlets should be encouraged to make a persuasive speech to a group of adults describing the pamphlet he or she has made.
2. **Performance assessment tasks encourage teamwork:** Working in teams is a skill that will help a student throughout life, especially if he or she chooses to work in a corporate set up. Therefore, it is a useful skill to acquire. Making group presentations, working on projects in a team, and so on, helps students to learn the value of collaboration at an early age. Division of tasks, cooperation, empathy are all valuable lessons that each student must learn.
3. **There is focus on personal habits and attitudes:** In performance assessment tasks, success depends on the learner's attitude almost as much as book learning. Inculcating habits such as flexibility, diligence, cooperation, tolerance,

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persistence, problem solving, planning and many more are all inherent to the performance assessment methodology.

It is important to have predetermined criteria to evaluate the students' performance. Students should not be scored or graded against their classmates and should be provided with the criteria before the assessment.

Student's feedback reflects levels of competency, rather than comparative scores. It is always useful to try to find in students' performance patterns of appropriate and inappropriate responses.

2.6 CHANGING CONCEPTS OF EDUCATIONAL OBJECTIVES AND RECENT CHANGES IN INSTRUCTIONAL OBJECTIVES

Bloom's taxonomy of educational objectives was revised in 2001 under the title of *A Taxonomy for Learning, Teaching and Assessing*. The revision work was done by authors Lorin. W. Anderson, David R. Krathwohl, Peter W. namely, Airasian, Kathleen A. Cruikshank and others. Due to the changes brought in the cognitive domain, the instructional objectives for this domain also need changes accordingly.

The following changes were made in the classification of educational objectives:

The nomenclatures of the categories under cognitive domain were changed.

- Knowledge was replaced by remembering.
- Comprehension was replaced by understanding.
- Application was replaced by applying.
- Analysis was replaced by analysing.
- Synthesis was replaced by creating.
- Evaluation was replaced by evaluating.

Rationale behind the changing concepts

It is evident that the six categories in the original classification of Bloom are in the form of 'noun', which has been changed to 'verb'. The rationale behind this change is simple, logical and easy to digest. Taxonomy of educational objectives, i.e., various categories reflect different forms of thinking. Thinking, being an active process, represents the forms of verbs more accurately than the noun. Therefore, some of the sub categories were reorganized and renamed. Knowledge, the first category, is a product of thinking and was considered inappropriate to describe a category of thinking and, therefore, it was replaced with the word 'remembering', the lowest level of cognitive domain activities.

Knowledge is a product of thinking (lower as well as higher order products) and was not clarifying its level of category; hence change was needed. Remember is the right word because it indicates the product of lower order thinking. We can cram, recall, recognize and remember something without understanding it. Comprehension is replaced by understanding, synthesis is replaced by creating, and so on. All these changes reflect the nature of the thinking process and the outcomes described by each category in a better way.

Check Your Progress

15. Why are performance assessments designed?
16. What are portfolios?

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2.6.1 Functions of Educational Objectives/Usefulness of Taxonomical Classification

Educational objectives perform the following functions:

- Bloom's taxonomy motivates educators to focus on all three domains of educational objectives.
- Creates a more holistic form of education to develop the whole personality of the learners.
- Whole personality development makes an individual more useful for his ownself and for the society.
- Allows teachers to select appropriate classroom assessment techniques for student evaluation and for the performance or skills to be evaluated.
- Understanding Bloom's taxonomy develops the competencies in the teachers through which a teacher can design effective learning experiences.
- Helps in devising and organizing fruitful and interesting co-curricular activities.
- Takes care of the all-round development of the personality of the child.
- Helps teachers in framing instructional objectives in behavioural terms.

2.6.2 Guidance Functions of Evaluation

Guidance and counselling of students have become one of the most important areas of school education. Due to diverse kinds of problems like stress and suicide committed by students, this area has become very important for students, parents and educational administration. Because of these reasons, counsellors are being appointed in schools and several guidance and counselling clinics and centres are coming up at different places to support students and parents. Some of the important guidance functions of evaluation are listed as follows:

- Evaluation results are very much useful for the guidance and counselling of the needy students.
- Proper educational and vocational guidance can be given to students on the basis of their evaluation on various abilities, interests, skills, attitudes, aptitude, values, and after knowing the strength and weakness of the needy students.
- On the basis of evaluation results of the test of anxiety and stress among students, proper guidance may be given to students to reduce their level of stress.
- Various types of personality disorders may be diagnosed by using variety of tests and the subject may be given proper guidance to cure or control them properly.
- Students may be helped in choosing the right kind of vocation or profession or career in which they may succeed and grow.
- Students may be helped in choosing suitable courses of study which suit them and in which they may excel.
- Based on the findings of evaluation, students may be guided and counselled properly to nurture and develop their life skills.

Check Your Progress

17. When was Bloom's taxonomy of educational objectives revised?
18. What is course of evaluation programme?

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2.7 SUMMARY

In this unit, you have learnt that:

- The study of classification is known as taxonomy.
- Bloom developed and proposed the classification of educational objectives in 1956 which is popularly known as Bloom's Taxonomy of Educational Objectives.
- Bloom classified educational objectives into three 'domains' which are as follows:
  - o Cognitive domain
  - o Affective domain
  - o Psychomotor domain
- Cognitive domain includes those objectives of education which attempt to develop mental faculties or intellectual abilities, that is, the ability of knowing, understanding, thinking and problem solving.
- Bloom has further classified cognitive domain into six major categories which are knowledge, understanding, application, analysis, synthesis and evaluation.
- Affective domain of Bloom's taxonomy of educational objectives is related to the development of emotions, values, attitudes and the development of those aspects of personality which are more influenced by heart than the mind.
- Affective domain has been further classified by D. R. Krathwohl, B. S. Bloom and B. B. Masia into five categories which are receiving, responding, valuing, organization, and characterization of values or value complex.
- Psychomotor domain deals with the development of motor abilities which in turn are responsible for skill development for performing any task.
- Psychomotor domain has been further classified by R. H. Dave into five categories which are initiation-observation, manipulation, precision, articulation and naturalization.
- Instructional objectives are desired behavioural changes in the form of statements formulated by the teacher for describing the observable outcomes of learning at the completion of classroom instructions.
- The following critical thinking skills are required in cognitive learning: convergent thinking, divergent thinking, critical thinking, problem solving and decision making.
- Bringing facts and data together from various sources and then applying logic and knowledge to solve the problem to achieve an objective is known as convergent thinking. Convergent thinking can be assessed by administering standard IQ tests, by various recognition or knowledge tests, logical discussions, etc.
- Divergent thinking is thinking outwardly instead of inwardly. It is the ability to develop original and unique ideas and then come up with a problem solution or achieve an objective. Divergent thinking typically occurs in a spontaneous, free-flowing manner, such that the ideas are generated in a random, unorganized fashion.
- The following are some of the techniques used to stimulate divergent thinking: brainstorming, recording ideas, free writing, and mind or subject mapping.
- Critical thinking comprises various modes of thinking, such as scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking and philosophical thinking.
- Problem solving is a mental process that involves discovering, analysing and solving problems. The ultimate goal of problem solving is to overcome obstacles and find a solution that best resolves the issue.
- Decision making can be regarded as the mental processes resulting in the selection of a course of action among several alternative scenarios. The end result of each decision-making process is a final selection.
- There are four stages those are involved in all group decision making: orientation stage, conflict stage, emergence stage and reinforcement stage.
- The assessments used in affective assessment are attitudes and values, interest, and self-concept.
- An attitude is a state of mind or a feeling or disposition. It is important to have a positive attitude about work.
- Various methods of measuring attitudes have been developed. Attitude measurement can be divided into two basic categories: direct measurement (A likert scale) and indirect measurement (projective techniques).
- Direct measurement involves recording the actual behaviour of people whose attitude is to be studied or asking them direct questions about their feelings. A Likert scale is a bipolar scale running from one extreme through a neutral point to the opposite extreme.
- Another tool for affective learning is assessing the interest of the student. This inventory helps the teachers in knowing the interest areas of their students so that they can encourage and get various opportunities to grow in a particular field.
- The self-concept is the way in which we think about and evaluate ourselves. The development of self-concept has two aspects: the existential self and the categorical self.
- Performance assessments are designed to judge a student's abilities to use specific knowledge and research skills. Performance assessment is a form of testing that requires students to perform a task rather than select an answer from a ready-made list.

2.8 KEY TERMS

- **Hierarchical:** It means learning at the higher level in any domain is entirely dependent on having acquired prerequisite knowledge and skills at lower level.
- **Cognitive domain:** It includes those objectives of education which attempt to develop mental faculties or intellectual abilities, that is, the ability of knowing, understanding, thinking and problem solving.

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- **Affective domain:** It is related to the development of emotions, values, attitudes and the development of those aspects of personality which are more influenced by heart than the mind.
- **Psychomotor domain:** It deals with the development of motor abilities which in turn are responsible for skill development for performing any task.
- **Events of instruction:** They constitute a set of communications of the teacher to the students which have the aim of aiding the learning process.
- **Curriculum:** It is a course of study; the linked series of academic courses leading to mastery of a discipline.
- **Likert scale:** It is a tool used to determine opinions or attitudes; it contains a list of declarative statements, each followed by a scale on which the subject is to indicate degrees of intensity of a given feeling.
- **Self-concept:** It is the composite of ideas, feelings and attitudes that a person has about his or her own identity, worth, capabilities and limitations.

2.9 ANSWERS TO 'CHECK YOUR PROGRESS'

1. American educational psychologist Benjamin Bloom developed and proposed the classification of educational objectives in 1956, which is popularly known as Bloom's Taxonomy of Educational Objectives.
2. The guidance functions of evaluation are as follows:
   (i) Evaluation results are very much useful for the guidance and counselling of the needy students.
   (ii) On the basis of evaluation results of the test of anxiety and stress among students, proper guidance may be given to students to reduce their level of stress.
3. The various categories of cognitive domain are knowledge, understanding, application, analysis, synthesis and evaluation.
4. Convergent thinking means the ability to give the 'correct' answer to standard questions that do not require the utilization of much creative faculty.
5. Problem solving is a mental process that involves discovering, analysing and identifying solutions to problems.
6. The first two steps in decision making are as follows:
   (a) Objectives are to be established first.
   (b) Objectives must be classified and placed in the order of importance.
7. The four decision-making stages are orientation stage, reinforcement stage, emergence stage and conflict stage.
8. Affective domain is related to the development of emotions, values, attitudes and the development of those aspects of personality which are more influenced by the heart than the mind. It also includes the development of interests, appreciation, feelings, likes and dislikes towards something.
9. Zimbardo defined attitude as, 'An attitude can be defined as a positive or negative evaluation of people, objects, events, activities, ideas, or just about anything in your environment'.
10. The two ways in which attitude can be measured are by either using direct measurement or indirect measurement.
11. The two scales that can be used to measure attitude are Thurstone scale and Likert scale.
12. It is important to measure the interest of the students in order to help them achieve their dream careers.
13. E. K. Strong devised a way to measure interest to help people who were quitting their military jobs to get new jobs.
14. Self-concept can be defined as the way in which we think about and evaluate ourselves.
15. Performance assessments are designed to judge a student's abilities to use specific knowledge and research skills.
16. Portfolios describe a student's variety of performance-based work. A portfolio might include a student's 'best work' and the student's evaluation of the strengths and weaknesses of several tasks.
17. Bloom's taxonomy of educational objectives was revised in 2001 under the title of*A Taxonomy for Learning, Teaching and Assessing*.
18. Course or programme evaluation is a systematic and organized process of collectingandanalysing data on some specific course or programme being run in any educationalinstitution including schools.

2.10 QUESTIONS AND EXERCISES

Short-Answer Questions

1. Describe 'knowledge' as the first level of cognitive domain.
2. Describe the reasons behind the changing concepts educational objectives.
3. Define 'instruction'.
4. What is programme evaluation?
5. What are the factors one has to keep in mind in order to be an affective learner?
6. How is the ability of critical thinking significant?
7. State few ways which can ensure that one makes good decisions.
8. What are the two aspects of the development of self-concept?
9. What are the purposes of performance assessment?

Long-Answer Questions

1. Discuss the classification of cognitive domain under educational objectives.
2. Discuss the classification of affective domain under educational objectives.
3. Explain the classification of psychomotor domain under educational objectives.

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4. State the functions of educational objectives.
5. Explain the three dimensions of learning.
6. Describe the techniques that help to stimulate divergent thinking.
7. What are the characteristics of critical thinking?
8. List and describe the steps involved in problem solving.
9. What do you understand by the term self-concept? How can it be used in the process of assessment?

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UNIT 3 CHARACTERISTICS OF A GOOD TEST

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Structure

3.0 Introduction
3.1 Unit Objectives
3.2 Reliability and Validity
3.3 Meaning of Reliability
  3.3.1 Characteristics
3.4 Methods of Computing Reliability
3.5 Factors Affecting Reliability
3.6 Validity: Meaning and Types
  3.6.1 Characteristics of Validity
  3.6.2 Types
  3.6.3 Methods of Validation
3.7 Factors Affecting Validity
  3.7.1 Relationship between Validity and Reliability
3.8 Summary
3.9 Key Terms
3.10 Answers to 'Check Your Progress'
3.11 Questions and Exercises
3.12 Further Reading

3.0 INTRODUCTION

A 'test' is a particular type of assessment that typically consists of a set of questions to be answered and administered under reasonably comparable conditions for all students. It is an advice or a systematic procedure for assessing a sample of behaviour by asking a set of questions in a uniform manner. Because a test is a form of assessment, tests also answer the question, 'how well does the individual perform either in comparison with others or in comparison with a performance tasks?' Psychological and educational tests are a standardized procedure to measure quantitatively or qualitatively one or more than one aspect or trait by means of a sample of verbal or non-verbal behaviour. A test consists of a standard set of questions to be answered or tasks to be performed. Items of a test are placed in increasing order of difficulty and its procedure of administration is standardized to ensure maximum objectivity. In the teaching-learning situation, psychological and educational tests are used to know about the level of achievement of the students.

The scientific phase of testing and measuring starts with the work of American psychologist E. L. Thorndike. Thorndike constructed and published a number of pioneer psychological tests. Ink-Blot test developed by psychologist Hermann Rorschach, intelligence test developed by French psychologist Alfred Binet and Theodore Simon, intelligence test on adults developed by American psychologist David Wechsler, attitude scale developed by Bhatia, etc., are the well-known examples of psychological tests. Psychological tests nowadays have become a very popular feature in nearly all fields of contemporary education and guidance.

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This unit covers the significance of the reliability and validity in qualifying a test as good. It also examines the methods of computing reliability, factors affecting reliability and validity, types of validity and factors affecting validity.

3.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Explain the concepts of validity and reliability
- Define reliability
- Identify the methods of computing reliability
- List the factors that affect reliability
- Identify the types of validity
- List the factors that affect validity
- Describe the relationship between validity and reliability

3.2 RELIABILITY AND VALIDITY

An educational test is not just a test that measures achievement in subjects of study, but is also a psychological test that leads to the over-all development of a student. According to American psychologist Anne Anastasi, 'Psychological test is essentially an objective and standardized measure of a sample of behaviours.' For American psychologist F. S. Freeman, it 'is a standardized instrument designed to measure objectively one or more aspects of a total personality by means of samples of verbal or non-verbal responses, or by means of other behaviours'.

A test is a stimulus selected and organized to elicit responses which can reveal certain psychological traits in the person who deals with them. The diagnostic or predictive value of psychological test depends upon the degree to which it serves as an indicator of a relatively broad and significant area of response. It is obvious that a psychological test is the quantitative and qualitative measurement of the various aspects of behaviour of the individual for making generalized statements about his total performances.

The aspects which affect the characteristics of a good test are as follows:

- Validity of the test
- Reliability of the test
- Objectivity of the test
- Usability of the test
- Comprehensive and preciseness of the test
- Administration of the test
- Test from economic viewpoint

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- Availability of the test
- Appearance of the test
- Standardization of the test
- Norms of the test

Some of the important characteristics of a test are analysed below.

Validity: Validity of a test refers to its truthfulness; it refers to the extent to which a test measures what it intends to measure. Standardization of a test requires the important characteristic viz., validity. If the objectives of a test are fulfilled, we can say that the test is a valid one. Validity of a test measures the truthfulness of a test. The validity of a test is determined by measuring the extent to which it matches with a given criterion. Let us take an example. Suppose we want to know whether an 'achievement test in mathematics' is valid. If it really measures the achievement of students in mathematics, the test is said to be valid, or else not. So 'validity' refers to the very important purpose of a test, and hence, it is the most important characteristic of a good test. A test may have other merits, but if it lacks validity, it is valueless.

Freeman states, 'An index of validity shows the degree to which a test measures what is purports to measure when compared with the accepted criteria'. American educational psychologist Lee J. Cronbaeh held the view that validity 'is the extent to which a test measures what it purports to measure'.

Reliability: Reliability refers to consistency of scores obtained by some individuals when re-tested with the test on different sets of equivalent items or under other variable examining conditions. It refers to the consistency of scores obtained by the same persons when they are re-examined with the same test on different occasions or with different sets of equivalent items or under different examining conditions. Reliability paves way for consistency that makes validity possible and identifies the degree to which various kinds of generalizations are justifiable. It refers to the consistency of measurement, i.e., how stable test scores or other assessment results are from one measurement to another. .

Reliability refers to the extent to which a measuring device yields consistent results upon testing and retesting. If a measuring device measures consistently, it is reliable. The reliability of a test refers to the degree to which the test result obtained is free from error of measurement or chance errors. For instance, we administer an achievement test in mathematics for students of class IX. In this test, Paresh scores 52. After a few days, we administer the same test. If Paresh scores 52 marks again, we consider the test to be reliable, because we feel that this test accurately measures Paresh's ability in mathematics. American psychologist and segregationist H. E. Garrett stated, 'the reliability of test or any measuring instrument depends upon the consistency with which it gauges the ability to whom it is applied'. The reliability of a test can also be defined as 'the correlation between two or more sets of scores on equivalent tests from the same group of individuals'.

Objectivity: Objectivity is an important characteristic of a good test. Without objectivity, the reliability and validity of a test is a matter of question. It is a pre-requisite for both validity and reliability. Objectivity of a test indicates two things: item objectivity and scoring objectivity.

Item objectivity refers to the item that must call for a definite single answer. In an objective-type question, a definite answer is expected from the test-takers. While framing the questions, some points to be kept in mind are: ambiguous questions, lack of proper direction, double barreled questions, questions with double negatives, etc. These concepts affect the objectivity of a test. Let us take an example of an objective item. Suppose we ask students to write about Gandhi. This question does not have objectivity, because here the answers will have different perceptions for different individuals and also the evaluation. If we ask the students 'what was Gandhi's father's name', this obviously will have only one answer and even the biasness of the evaluator will not affect the scoring. So, all the items of a test should be objective.

Objectivity of scoring means whosoever checks the test paper, it would fetch the same score. It implies that the subjectivity or personal judgment or biasness of the scorer should not affect the scores. The essay-type questions are subjective and the scores are affected by a number of factors like mood of the examiner, his language, his biasness, etc. Essay-type questions can have objectivity if scoring key and proper direction for scoring are provided.

Usability: Usability of a test refers to the practicability of a test. It refers to the degree to which the test can be successfully used by the teachers/evaluators. Usability of a test depends on certain aspects which are expressed in the following manner:

(a) *Comprehensibility:* The test items should be free from ambiguity and the direction to the test items and other directions to the test must be clear and understandable. The directions for scoring and the interpretation of scores must be within the comprehension of the user.

(b) *Ease of administration:* If the directions for administration are complicated or if they need more time and labour, the users may lag behind to use such tests. The directions for administration must be clear and concise. The test paper should be constructed according to the availability of time. Lengthy tests involving more time may not be preferred for use.

(c) *Availability:* If a test is not available at the time of necessity, it lacks its usability. Most of the standardized tests are of high validity and reliability, but their availability is very less. So it is desirable that in order to be reliable, the tests must be readily and easily available.

(d) *Cost of the test:* The cost of the test must be cheap, so that the schools and teachers can afford to purchase and use them. If it is costly, then every school cannot avail it. So a good test should be of reasonable price.

(e) *Ease of interpretation:* A test is considered to be good if the test scores obtained can be easily interpreted. For this, the test manual should provide age norms, grade norms, percentile norms and standard score norms like standard scores, T-scores, Z-scores, etc. So 'interpretability' of test refers to how readily the raw scores of test can be derived and understood.

(f) *Ease of scoring:* A test in order to be usable must ensure ease of scoring. The scoring procedure must be a simple one.

All the directions for scoring and the scoring key should be available, to make the scoring an objective one. The examiner's biasness or the handwriting of the examinee should not affect the scoring of a test.

Evaluation is the part and parcel of teaching learning situation. How far the instructional objectives have been achieved, how far the curriculum and methods of teaching is suitable for the students, and everything can be known through the process of evaluation. Test is a tool for evaluation. In the classroom situations, the teachers develop tests to measure and evaluate students' achievement. Different subject teachers construct different tests for their students. Teacher-made tests serve the purposes, viz., measure the pupils' achievement, know how far the specific objectives have been fulfilled, diagnose the learning difficulties, arrange specific remedial measures, award grades, etc. Teacher-made tests are based on content and objective specific to teacher's own class or school. They may deal either with a specific topic or skill or with larger segments of knowledge and skill. Generally, the teacher-made tests are less reliable in comparison to the standardized test. They have a limited use, to a particular class or a single school. Teacher-made tests are well adapted to outcomes and content of local curriculum.

Flexibility affords continuous adaptation of measurement to new materials and changes in procedure. It too often neglects complex learning outcomes.

The quality of items of the teacher-made tests is lower than standardized tests because of a teacher's limited time and lack of opportunity to pretest items. The score comparisons and interpretations of teacher-made tests are limited to local school situation. Teacher-made tests evaluate student's day-to-day progress and their achievement on work units of varying size.

Standardized tests follow four steps for its construction, but teacher-made tests follow only two steps for its construction. Such tests do not need rigorous process of standardization. They are not out, not subjected to rigorous item analysis, and not evaluated for their validity and reliability. Simply, teacher-made tests go through two stages, viz., 'planning' of the test and 'preparation' of the test.

Mostly, teacher-made tests are used for formative evaluation. A teacher-made test may be a full-fledged achievement test covering the whole course of a particular subject or a unit test covering one unit of study. The results of teacher-made tests are useful for action researches. The teacher-made tests are evaluated by the same teacher, who makes the test papers. These tests if skillfully prepared can even serve the purpose of standardized tests. Table 3.1 differentiates between teacher-made tests and standardized tests.

Table 3.1 Comparison between Teacher-Made Tests and Standardized Tests

Teacher-made tests	*Standardized tests*
Teacher-made tests are prepared by the classroom subject teachers.	Standardized tests are prepared by the subject experts.
Teacher-made tests follow two steps: planning and preparation.	Standardized tests follow four steps: planning, preparation, try-out and evaluation.
Teacher-made tests are useful for the concerned classroom only.	Standardized tests are useful all over the world.
Teacher-made tests are useful for action research.	Standardized tests are useful for basic or fundamental research.
The items are not arranged according to their difficulty level.	The items are arranged according to their difficulty level.
The scores of the teacher-made tests have limited comparison value and their interpretations are limited to local school situation.	The scores of standardized tests can be compared with those of norm groups.
The reliability of teacher-made tests are usually unknown, but can be high if carefully constructed.	The reliability of standardized tests is high, commonly between 80 and 95, frequently around 90.
The quality of items is unknown unless test item file is used.	The quality of items is very high.
Scoring key is not used.	Scoring key is very necessary and hence used.
In case of teacher-made tests, there may or may not be objective type tests.	In case of standardized test, usually objective type tests are used.
Take less time for construction and experts may not be involved in it.	Tests involve so many experts, use so many sophisticated procedures and thus take a long time for construction.
Based on content and objectives specific to teacher's own class or school.	Based on content and objectives common to many schools throughout the country.

3.3 MEANING OF RELIABILITY

Reliability paves way for consistency that makes validity possible and identifies the degree to which various kinds of generalizations are justifiable. It refers to the consistency of measurement, which is how stable test scores or other assessment results are from one measurement to another. Reliability refers to the extent to which a measuring device yields consistent results upon testing and retesting. If a measuring device measures consistently, it is reliable. The reliability of a test refers to the degree to which the test results obtained are free from error of measurement or chance errors.

3.3.1 Characteristics

The characteristics of reliability are as follows:

- It refers to the degree to which a measuring tool yields consistent results upon testing and retesting.
- It indicates the level to which a test is internally consistent, i.e., how accurately the test is measuring.
- It refers to the results obtained with measuring instrument and not to the instrument itself.

Check Your Progress

1. Define test.
2. What does objectivity of a test indicate?

- An estimate of reliability refers to a particular type of stability with the test result.
- Reliability is necessary but not a sufficient condition for validity.
- Reliability is a statistical concept.
- It refers to the preciseness of a measuring instrument.
- It is the coefficient of internal consistency and stability.
- It is the function of the length of a test.

3.4 METHODS OF COMPUTING RELIABILITY

When examining the reliability coefficient of standardized tests, it is important to consider the methods used to obtain the reliability estimates. American Psychological Association (APA) introduced several methods of estimating reliability. The methods are similar in that all of them involve correlating two sets of scores, obtained either from the same assessment procedure or from equivalent forms of the same procedure. The chief methods of estimating reliability are shown here. The reliability coefficient resulting from each method must be interpreted according to the type of consistency being investigated.

We will consider each of these methods of estimating reliability in detail in Table 3.2.

Table 3.2 Methods of Estimating Reliability

Method	*Types of reliability measure*	*Procedure of administration*
Test-Retest method	Measures of stability and precision	Use the same test twice to the same group with anytime interval between tests, from several minutes to several years.
Equivalent forms method	Measure of equivalence	Apply two equal forms of the test to the same group in close time gap.
Split-Half method	Measure of internal consistency	Apply the test once. Score two equivalent halves of test (e.g., odd items and even items), correct correlation between halves to fit whole test by Spearman–Brown formula to measure reliability of the test.
Kuder–Richardson method	Measure of Internal consistency	Give test once, score total and apply Kuder–Richardson formula to know the degree of reliability.
Inter-rater method	Measure of consistency	Use a set of student response requiring judgmental scoring to two or more raters and have them independently score the responses.

Check Your Progress

3. What is reliability?
4. List any two characteristics of reliability.

(i) Test-retest method

To estimate reliability by means of the test-retest method, the same assessment is administered twice on the same group of pupils with a given time interval between the two administrations. The resulting assessment scores are correlated and this correlation coefficient provides a measure of stability, i.e., it indicates how stable the assessment results are over a given period of time. If the result shows that the students who were at good position at the first administration, and also they are at good position in the second administration, the test has stability. The closer the agreement between the two administrations of the test, the greater is the reliability co-efficient or co-efficient of stability.

A high test–retest reliability or coefficient of stability shows that there is low variable error in the sets of obtained scores. A low coefficient of stability indicates that there is high variable error in the obtained scores. The error variance contributes inversely to the coefficient of stability. Such stability is indicated by a large correlation coefficient, that a perfect positive relationship is indicated by 1.00, perfect negative correlation by –1 and no correlationship by 0.00. Measures of stability in the 0.80 range are generally reported for standardized tests. The Pearson's method of correlation is mostly used for obtaining the coefficient of reliability.

When we are dealing with the measures of stability, it is more important to keep in mind about the time gap between assessments. If the time gap is short, say a day or two, the consistency of the results will be inflated because a student remembers the tasks and responses accordingly. If the time interval is a long one, the results will be influenced not only by the instability of the assessment procedure but also by actual changes in the student over that period of time. The best time interval between assessment administrations depends largely on the use to be made of the results.

Limitations of test–retest method

The limitations of test-retest method are as follows:

- Testing conditions during test and retest may vary which result in instability in the scores.
- The individual's health, emotional conditions, mental health, motivational conditions and mental set do not remain the same in both the administrations at two occasions.
- If the test is repeated immediately, the test-taker may recall the first answer. This may increase the scores. Besides the memory effects, practice and confidence induced by familiarity with the test will almost affect the scores the second time. This is known as 'the carry-over effect' or 'transfer effect' or 'memory effect' or 'practice effect'.
- If the time gap between two administrations is a lengthy one, additional learning or changes in the characteristics of the individual will affect the scores at the later administration, and it may decline the reliability of a test.

(ii) Equivalent forms method

This method of reliability is also known as parallel forms reliability/equivalent forms reliability/comparable forms reliability. Two parallel forms of a test can be constructed by selecting the samples in each form from the same universe of contents. By parallel forms, we mean that the forms of tests are equivalent as far as the content, objectives, format, difficulty level and discriminating value of items, length of the test, etc., are concerned. Parallel tests have equal mean scores, variance and equal inter-correlation among items. So the two parallel forms of a test must be similar in all respects, but there should not be a duplication of test items. The equivalent forms method of establishing reliability is widely used in standardized testing because for most standardized tests, two or more forms are available when the two forms are virtually alike, reliability is too high; when they are not sufficiently alike, reliability will be too low. Pearson's method of correlation is used for calculating the coefficient of correlation between two sets of scores obtained by administering the two forms of the test. This coefficient of correlation is termed as the 'coefficient of equivalence'.

Limitations of equivalent forms method

The limitations of equivalent forms method are as follows:

- Construction of equivalent test forms is too difficult in comparison to others.
- There is a chance of memory effect or practice effect to operate at the administration of the second form.
- The testing conditions while administering the two forms may be different and the test-takers may not be in a same physical, mental or emotional state at both the time of administration.

(iii) Split-half method

Reliability can also be calculated from a single administration of a single test. The test is administered to a group of pupils and then is divided into half for scoring. To divide the test into halves that are equivalent, the procedure is to score the even-numbered and the odd-numbered items separately. This results two scores for every student which when correlated, gives a measure of internal consistency. This coefficient indicates the degree to which consistent results are obtained from the two halves of this test and may be thought of as the half-length test reliability estimate.

Among the different methods of dividing the test, the odd and even split is used mostly. Here, items no.1, 3, 5, 7, 9, 11, etc., (the odd-numbered items) constitute one half, and items no. 2, 4, 6, 8, 10, etc., (the even-numbered items) constitute the other half of the test. Scores of individuals on these two halves are correlated to know the degree of reliability between the two. The coefficient of correlation is usually denoted by the symbol (r_{hh}). The reliability coefficient of the whole test (r_{xx}) is estimated from the value of r_{hh} using the following:

Spearman-Brown formula:

$$r_{xx} = \frac{2r_{hh}}{1+r_{hh}}$$

$$= \frac{2 \times \text{reliability of half test}}{1 + \text{reliability of half test}}$$

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$$= \frac{2 \times \text{reliability of half test}}{1 + \text{reliability of half test}}$$

NOTES

Where,

r_{xx} = Reliability of whole test

r_{hh} = Reliability of half test

Limitations of split-half method

The limitations of split-half method are as follows:

- The whole test can be divided into two parts in a number of ways. As such, reliability coefficient obtained through this method may vary from method to method.
- As the test is once administered, the factor chance error may affect the scores on the two halves, and thus, tend to make the reliability coefficient too high.
- It is very difficult to divide the test into two halves in such, way that both halves are of equivalent difficulty levels and discriminating power.
- This method cannot be used in power test.

(iv) Kuder–Richardson method

This method of reliability was developed by G. F. Kuder and M. N. Richardson. This is also known as rational equivalence method of reliability. It is most useful for homogenous test reliability. Like the split-half method, the Kuder–Richardson method provides an internal consistency but it does not require splitting the assessment in half for scoring purposes. This method enables us to calculate the inter-correlation of the items of the test and the correlations of the items with the test as a whole. All the items in the test measure the same ability—the correlation between the items are equal, that all the items are of same difficulty and that all the items are highly homogeneous. When we use Kuder–Richardson formula, it is required that all the items of the test should be psychologically homogeneous and that every item in the test has a high correlation with every other item. This is referred to as inter-item consistency. This coefficient is called the 'coefficient of rational equivalence'. This coefficient provides some signals of how internally consistent or homogeneous the items of the test are.

Kuder–Richardson formula used to compute the internal consistency coefficient of test items is:

$$r_{tt} = \left[\frac{n}{n-1}\right]\left[\frac{\sigma x^2 - \Sigma pq}{\sigma x^2}\right]$$

Where,

r_{tt} = Reliability index

n = Number of items in the test

p = Proportion of right responses

q = Proportion of wrong responses

Example: A test consisting of 50 items and standard deviation of test score is 7.5 and the sum of the product of proportion of right and wrong responses on the item is 10.43. Calculate the reliability.

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Solution:

$$r_{tt} = \left[\frac{n}{n-1}\right]\left[\frac{\sigma x^2 - \Sigma pq}{\sigma x^2}\right]$$

$$= \left[\frac{50}{50-1}\right]\left[\frac{7.5^2 - 10.43}{7.5^2}\right]$$

The reliability coefficient of the test is 0.84.

The KR-21 method is also a simple one for calculating reliability of a test. The test is administered once on a group to determine quickly the reliability. The mean and variance are calculated and then the following formula KR-21 is used.

$$r_{tt} = \frac{n\,\sigma\,x^2 - M\,(n - M)}{\sigma x^2\,(n-1)}$$

Where,

r_{tt} = Reliability of the whole test

n = Number of items in the test

M = Mean of the test scores

σx = Standard deviation

Example: An objective test of 100 multiple items have been administered to a small group of students. The mean of test score is 50 and standard deviation is 10. Calculate the reliability coefficient of the test.

Solution:

$$r_{tt} = \frac{n\sigma x^2 - M\,(n - M)}{\sigma x^2\,(n-1)}$$

$$= \frac{100 \times 10^2 - 50\,(100 - 50)}{10^2\,(100-1)}$$

$$= \frac{100 \times 100 - 50\,(50)}{100 \times 99}$$

$$= \frac{10000 - 2500}{9900}$$

$= 0.76$

The reliability coefficient of the test is 0.76.

Limitations of Kuder–Richardson method

The limitations of Kuder–Richardson method are as follows:

- Kuder–Richardson formulae are not suitable for speed assessments—assessments with time limits that prevent students from attempting all the items.
- The formulae indicate the consistency of student response from one day to the other.

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- It cannot be used for power test and heterogeneous tests.
- The different Kuder–Richardson formula results differ in reliability coefficient.
- In case all the items of the tests are not highly homogeneous, this method will produce lower reliability coefficient.

(v) Inter-rater method

This method assesses reliability through scoring/evaluating, done by two or more independent judges for every test.The various scores given by the judges are then compared to determine the consistency of estimations.The way the comparison is carried out is: each rater assigns each test item a score, which would be on a scale from 1 to 10.Then the correlations between any two ratings are calculated. There is another method for testing inter-rater reliability. In this method, raters identify a category for each observation and then compute the percentage of agreement among the raters. For instance, if the raters are in agreement 7 times out of 10, the test will be said to have a 70 per cent inter-rater reliability rate.

In case the raters seem to be in disagreement, it would imply that either the raters need to be trained again or the scale is defective. Sometimes, it so happens that various raters would have different opinions about measurement results emerging from the same object, such as a scientific experiment or a test, wherein first the test is carried out, then its results are interpreted, recorded and presented. At any of these stages, the rater may become affected by rater's bias (the tendency to rate in the direction of what the rater expects). There may also be discrepancy during interpretation and presentation of results, for instance, the round-off may be different in terms of higher or lower digit next to the decimal.

Limitations of inter-ratermethod

The limitations of inter-rater method are as follows:

- The method can be tedious because inter-rater reliability statistics need to be calculated separately for every item and every pair of raters.
- It is a lengthy and difficult task to train the raters such that they are able to reachan exact agreement.
- Even when they are trained, the forced consensus might render the ratings inaccurate and this would be a threat to the validity of the student's scores.
- The resulting estimates might turn out to be too conservative if two raters show differences in the method used on the rating scale.

3.5 FACTORS AFFECTING RELIABILITY

The reliability of a test is affected by a couple of factors which are explained in the following manner:

(i) Length of the test: There is positive correlation between the number of items in a test and the reliability of a test. The more the number of items the test contains, the greater is its reliability. In several tests, the scores of sub-tests and whole tests are calculated separately and their reliability is also calculated separately. The reliability of the whole test is always more than the sub-test, because whole test means more items, which is better representation of the content.

(ii) Construction of the test: The nature of items, their difficulty level, objectivity of scoring, item interdependence and alternative responses are factors which affect the reliability. More alternative responses will increase the reliability of the test.

(iii) Nature of the group: Reliability of a test will be more if the test is administered to a heterogeneous group. The more the variability, the higher the reliability coefficient.

(iv) Testing conditions: If the testing conditions are not similar at all the places, then differences in scores are obtained. The physical conditions of the tests and the environmental factors around the test-taker affect the reliability of a test.

(v) Guessing and chance errors: Guessing paves the way to increase error variances and it reduces reliability. If there are more opportunities for guessing in the test, the test will yield less reliable results.

(vi) Test instructions: If instructions in the test are complicated or difficult to understand, there will be less consistency in the scores. If the test-taker will not understand the instruction properly, his way of response will be wrong and this will hamper the reliability of test.

(vii) Too easy or too difficult items: Too easy or too difficult items fail to distinguish between good and bad students which otherwise affects the reliability of a test.

The other factors which affect the reliability of tests are: subjectivity of the examiner, clerical error, interval between testing, effect of practice, etc.

3.6 VALIDITY: MEANING AND TYPES

The validity of a test is determined by measuring the extent to which it matches with a given criterion. It refers to the very important purpose of a test, and it is the most important characteristic of a good test. A test may have other merits, but if it lacks validity, it is valueless.

3.6.1 Characteristics of Validity

The characteristics of validity are as follows:

- Validity is a unitary concept.
- It refers to the truthfulness of the test result.
- In the field of education and psychology, no test is perfectly valid because mental measurement is not absolute but relative.
- If a test is valid, it is reliable; but if a test is reliable, it may or may not be valid.
- It is an evaluative judgment on a test. It measures the degree to which a test measures what it intends to measure.
- It refers to the appropriateness of the interpretation of the result, and not to the procedure itself.

Check Your Progress

5. How to construct two parallel forms of a test?
6. State two limitations of Kuder–Richardson method.

Check Your Progress

7. Name one method of calculating reliability.
8. List the limitations of the test-retest method.
9. What is item objectivity?

- It refers to degree means high validity, moderate validity and low validity.
- No assessment is valid for all the purpose. A test is valid for a particular purpose only.

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3.6.2 Types

Validity is a specific characteristic of a test. There are different ways of calculating the validity of a test based on the objectives with which we validate the test. The six types of validity are discussed below.

(i) **Face validity:** When a test appears to measure what the test user wishes or intends to measure, it is said to possess face validity. Thus, face validity refers not to what the test measures, but what the test appears to measure, i.e., whether it seems to be relevant to its various objectives. Test contents should not appear to be inappropriate or irrelevant. If a test measures what the test author desires to measure, we say that the test has face validity. Face validity does not require any statistical technique. It is based on subjective judgment. Whenever a test is prepared, it is submitted to experts to assess if it measures what it intends to measure. It is the first step in validating the test. Once the test is validated at face, we may proceed further to compute validity coefficient. For example, suppose we prepare a test to measure 'skill in division'. If all the questions on the test are related to division, we can say that the test has face validity.

(ii) **Content validity:** An analysis of the content of an assessment evaluates the appropriateness of the content and determines the extent to which the assessment tasks provide a relevant and representative sample of the content under consideration. Content considerations are especially very important when validating achievement testing or constructing classroom tests. Content validity refers to the extent to which a test contains items representing the behaviour that we are going to assess. It is generally assessed by a critical scrutiny of the test contents to determine whether they cover a representative sample of behaviour or not. As it is measured from the content, such type of validity is referred to as content validity. Content validity of a test is estimated by assessing the presence of the content to be assessed in the test paper. Suppose we want to construct an achievement test on English. So all the questions of the test should be related to prose, poetry, novel, grammar, etc., and all the items must measure the different behavioural objectives like knowledge, understanding, application, analysis, synthesis and evaluation.

Content validity rests upon an expert analysis on the items included in the test. Content validity is also known as 'curricular validity' or 'rational validity' or 'logical validity'.

(iii) **Concurrent validity:** The term 'concurrent validity' is used to refer the process of validating a new test by correlating it with some available source of information which might have been obtained shortly before or shortly after the new test is given. Concurrent validity indicates to which extent the test scores correspond to already accepted measures of performance (or status made at the same time). Suppose we want to administer an intelligence test upon an individual. Now the test is administered upon the individual and the intelligence scale is administered upon the same individual. If the coefficient of correlation is high, the intelligence test is said to have high concurrent validity. Concurrent validity is relevant to the tests employed for diagnosis. When new tests are validated against previous tests, these previous or established tests are known as criteria for the new tests.

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(iv) **Construct validity:** A 'construct' is an individual characteristic that we assume exists in order to explain some aspect of behaviour. Whenever we wish to interpret assessment results in terms of some individual characteristics (e.g., reasoning, problem-solving activity), we are concerned with a construct. The construct validity of a test is the extent to which the test may be said to measure a theoretical construct or trait. Examples of such construct are scholastic aptitude, mechanical comprehension, anxiety, neuroticism, etc. Construct validation requires the gradual accumulation of information from a variety of sources. When we interpret assessment results as a measure of a particular construct, we are implying that there is such a construct that differs from other constructs, and that the results provide a measure of the construct, i.e., little influenced by extraneous factors. Verifying such implications is the task of construct validation. Although construct validation has been commonly associated with theory building and theory testing, it also has usefulness for the practical use of assessment results. It takes place primarily during the development and try-out of a test or an assessment, and is based on an accumulation of evidence from many different sources. When selecting a published test that presumably measures a particular construct, such as logical reasoning or writing comprehension, the test manual should be tested to determine what evidence is represented to support the validity of the proposed interpretations.

(v) **Predictive validity:** Predictive validity of a test refers to the predictive capacity of a test. It refers to the effectiveness of a test in predicting future outcomes in a particular area. The word 'prediction' may be used in more ways than one. In the broader sense, it would mean prediction from the test to a criterion situation. In the limited sense, however, it would imply prediction over a time period. When used in the limited context, it may be referred to in the sense of 'predictive validity'. Predictive validation provides the most relevant information for tests used in the selection and classification of personnel. Some other uses include hiring job applicants, selecting students for admission to college or professional schools, and assigning military personnel to occupational training programmes. Take an example where we have prepared an entrance test for admission into B.Ed. course, and based on the scores, we have admitted the candidates. These candidates completed the B.Ed. course and appeared for the final B.Ed. examination. The scores of the entrance test and the scores of the final B.Ed. examination are correlated. If the coefficient of correlation is high, we say that the entrance test has high predictive validity.

(vi) **Criterion validity:** Criterion validity evidence tells us just how well a test corresponds with particular criteria. Criterion validity includes both predictive validity and concurrent validity. A test may be validated against as many criteria as there are specific uses for it. Whenever test scores are to be used to predict future performance or to estimate current performance on some valued measure other than the test itself (called a criterion), we are especially concerned with

evaluating the relationship between the test and the criterion. For example, speaking-readiness test scores might be used to predict a student's future a achievement in speaking, or a test of dictionary skills might be used to estimate the student's current skills in the actual use of the dictionary. The first example is of predictive validity and the second example is of concurrent validity.

3.6.3 Methods of Validation

Different types of validity needs different methods for assessment. The methods used for assessing the validity of a test are discussed below.

(i) Correlation method: Correlation method is used in most of the cases for calculating the validity of a test. Multiple correlation is used where more than two measures are involved in which English mathematician and biometrician Karl Pearson's 'r' is used. Several methods are used for this, but the following method is a popular one.

$$r = \frac{N\Sigma XY \times \Sigma X \Sigma Y}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2]\,[N\Sigma Y^2 - (\Sigma Y)^2]}}$$

Where,

r = Validity index

N = Size of sample

X = Raw scores in the test X

Y = Raw scores in the test Y

XY = Sum of the products of each X score multiplied with its corresponding Y score

In order to make the calculation an easy one, we can use the above formula in this way:

$$r = \frac{N\Sigma dxdy - \Sigma dx \Sigma dy}{\sqrt{[N\Sigma dx^2 - (\Sigma dx)^2]\,[N\Sigma dx^2 - (\Sigma dx)^2]}}$$

Where,

r = Validity index

N = Size of the sample

dx = X – M

dy = Y – M

X = Raw score of X group

Y = Raw score of Y group

M = Mean

Sometimes, we need to predict the future result of somebody with reference to the present result. The following regression equation is used for this purpose:

$$y = r\frac{\sigma_y}{\sigma_x}(X - Mx) + My$$

Where, Y = Predicted value

My = Mean of predicted score (Y)

Mx = Mean of test score (X)

σ_y = Standard deviation of predicted score (Y)

σ_x = Standard deviation of test score (X)

X = Test scores (basis of prediction)

Y = Predicted value

(ii) Cross validation: Cross validation indicates a process of validating a test by using a population sample that is different from the sample on which it was originally standardized. It is necessary because the validity data may be high or low due to chance factors peculiar to the standardization sample. When test is administered to various samples in a variety of situations, it is being cross-validated. The different types of cross validation are: validity extension, validity generalization and psychometric signs.

3.7 FACTORS AFFECTING VALIDITY

Numerous factors tend to make assessment results invalid for their intended use. Let us have a discussion regarding the factors which affect the validity of a test.

(i) Lack of clarity in directions: Instructions that do not clearly indicate to the student how to respond to the tasks and how to record the responses decreases validity of a test. If the directions are not clear, the students will misunderstand the purpose of the test, and this in turn will hamper the validity of the test.

(ii) Ambiguity: Ambiguous statements lead to confusion and misinterpretation. Ambiguity sometimes confuses the good students more than it does the poor students. So no question of the test should be ambiguous.

(iii) Length of the test: Lengthening of a test not only increases its reliability but also its validity. If a test is too short to provide a representative sample of the performance we are interested in, its validity will suffer accordingly.

(iv) Nature of the group: A test may be valid for one group, but may not be valid for another. In heterogeneous groups, the scores are widely distributed and the validity coefficients are likely to be higher.

(v) Difficult reading vocabulary and sentence structure: Vocabulary and sentence structure that are too complex for the students taking the assessment, result in the assessment's measuring reading comprehension and aspects of intelligence, which will lessen the validity of a test.

(vi) Inadequate time: Sometimes, the importance is given upon speed test instead of power test. In the field of achievement test, if sufficient time will not be given to the students, it reduces the validity of interpretations of results. However, assessments of achievement should minimize the effects of speed on student performance.

(vii) Poorly constructed test items: Sometimes, the test items are very subjective, vague, unclear, not objective, etc., and this affects the validity of a test.

Check Your Progress

10. How is the validity of a test determined?
11. List the methods for assessing the validity of a test.

(viii) **Improper arrangement of items:** The items in a test should be arranged according to the difficulty order. It means the items should be arranged from easy to difficult. If difficult items are placed first, it will take time and makes the student confused. So the items of a test should be arranged properly in order to develop the validity of a test.

(ix) **Identifiable pattern of answers:** Correct answers in some systematic order enables a student to guess the right answers more easily, and it affects the validity of a test.

(x) **Factors in administration and scoring:** In the case of teacher-made tests, the factors like insufficient time, unfair aid to individual students who ask for help, cheating and unreliable scoring by students tend to lower validity. In case of a standardized test, failure to follow the standard directions and time limits, or giving students unauthorized assistance or errors in scoring similarly contribute to lower validity. So, all these factors should be checked for ensuring validity of a test.

(xi) **Cultural influences:** Cultural influence, socio-economic status, social class structure, etc., affect the test scores as well as validity of a test.

(xii) **Criterion correlated to the test:** The criterion, for which the validity is assessed, should be a reliable one and free from bias, or else it will affect the validity.

3.7.1 Relationship between Validity and Reliability

Reliability and validity are closely related, even though they cannot be interchanged. An assessment that has very low reliability will also have low validity; quite obviously, a measurement that has low levels of accuracy or consistency is not likely to suitably fulfil its objective. However, at the same time, the factors necessary for achieving a considerably high degree of reliability can affect validity negatively. For instance, consistent assessment settings lead to better degree of reliability because they minimize the 'noise' (variations) in the results. Alternatively, something that can enhance validity is flexibility in assessment exercises and settings. Such flexibility enables assessment to be customized to the learner's context and to be made specific and suitable for certain groups of students. Insistence on entirely consistent assessment settings for achieving high reliability will lead to minimum flexibility, and may, in turn, bring down validity.

For every dimension of interest and specific query or set of queries, there are multiple ways to devise questions. Even though the focal point should always remain the predetermined purposes of the research, there are good or poor questions for any particular operationalization. How can you evaluate the measures?

Two chief criteria of evaluation in any measurement or observation are as follows:

1. If we are measuring what we set out to measure
2. If the same measurement process always shows the same results

These two criteria are validity and reliability.

The key concerns of 'reliability' are stability and consistency. This means that if you are using a certain tool to make measurements, is that tool giving you the same result each time you use it? To understand the concept more clearly, consider

measurement processes in different contexts, such as for woodwork or construction work, a tape measure is an extremely reliable measuring tool.

Suppose you have a piece of wood that is 2½ feet long. You measure it once with the tape measure and find that it is of 2½ feet. Suppose you measure it again and you get the same result—2½ feet. If you measure it over and over again and you get the measurement of 2½ feet each time, this means that the tape measure is capable of giving you reliable results.

Validity is concerned with the extent of measurement of what we hope to measure (and what we think we are measuring). To continue with our previous example of measuring the wood block, a tape measure that shows accurately spaced inches, feet, etc., should show up valid results as well. Measuring the wooden block with a 'reliable' tape measure should give an accurate measurement of the block's length.

When applying these concepts to educational research, it is better to use measurement tools that are both reliable and valid. So, this means that a test should have questions that receive consistent answers even when asked a number of times– this is reliability. Similarly, a test should contain questions that get correct responses from respondents – this is validity.

3.8 SUMMARY

In this unit, you have learnt that:

- Standardization of a test requires the important characteristics, i.e., validity. If the objectives of a test are fulfilled, then we can say that the test is a valid one.
- If a test is valid, obviously it is reliable; but if a test is reliable, it may or may not be valid.
- Content considerations are especially very important when validating achievement testing or constructing classroom tests.
- Predictive validity of a test refers to the predictive capacity of a test.
- Criterion validity evidence tells us just how well a test corresponds with a particular criterion.
- Correlation method is used in most of the cases for calculating the validity of a test.
- Cross validation indicates a process of validating a test by using a population sample which is different from the sample on which it was originally standardized.
- Reliability refers to consistency of scores obtained by some individuals when re-tested with the test on different sets of equivalent items or under other variable examining conditions.
- To estimate reliability by means of the test-retest method, the same assessment is administered twice on the same group of pupils with a given time interval between the two administrations.
- Reliability can also be calculated from a single administration of a single test. The test is administered to a group of pupils and then is divided into half for scoring.

Check Your Progress

12. What is validity?
13. What are the types of validity?
14. Define content validity.
15. What do you mean by concurrent validity?
16. What is construct validity of a test?
17. Name the different types of cross validation.

- The standard error of measurement is the standard deviation of the errors of measurement.
- Face validity refers not to what the test measures, but what the test appears to measure, i.e., whether it seems to be relevant to its various objectives.
- Criterion validity includes both predictive validity and concurrent validity.
- A high test-retest reliability or coefficient of stability shows that there is low variable error in the sets of obtained scores and vice versa.

3.9 KEY TERMS

- **Validity:** It is the extent to which a test measures what it intends to measure.
- **Item objectivity:** The item must call for a definite single answer.
- **Concurrent validity:** It is the extent to which the test scores correspond to already accepted measures of performance.

3.10 ANSWERS TO 'CHECK YOUR PROGRESS'

1. A test is a stimulus selected and organized to elicit responses which can revealcertain psychological traits in the person who deals with them.
2. Objectivity of a test indicates two things—item objectivity and Scoring objectivity.
3. Reliability refers to the extent to whicha measuring device yields consistent results upon testing and retesting.
4. The characteristics of reliability are as follows:
   (i) It refers to the preciseness of a measuring instrument.
   (ii) It is the coefficient of internal consistency and stability.
5. Two parallel forms of a test can be constructed by selecting the samples in each form from the same universe of contents.
6. The limitations of Kuder–Richardson method are as follows:
   (i) The formulae indicate the consistency of student response from one day to theother.
   (ii) It cannot be used for power test and heterogeneous tests.
7. One of the method of calculating reliability is the split-half method.
8. The limitations of test-retest method are as follows:
   - Testing conditions during test and retest may vary which results in instability in the scores.
   - The individual's health, emotional conditions, mental health, motivational conditions and mental set do not remain the same in both the administrations at two occasions.
   - If the test is repeated immediately, the test-taker may recall the first answer. This may increase the scores. Besides the memory effects, practice and confidence induced by familiarity with the test will almost affect the scores the second time. This is known as 'the carry-over effect' or 'transfer effect' or 'memory effect' or 'practice effect'.
   - If the time gap between two administrations is a lengthy one, additional learning or changes in the characteristics of the individual will affect the scores at the later administration, and it may decline the reliability of a test.
9. Item objectivity refers to the item that must call for a definite single answer. In an objective-type question, a definite answer is expected from the test-takers. While framing the questions, some points to be kept in mind are: ambiguous questions, lack of proper direction, double barreled questions, questions with double negatives, etc. These concepts affect the objectivity of a test.
10. The validity of a test is determined by measuring the extent to which it matches witha given criterion.
11. The methods for assessing the validity of a test are as follows:
    (i) Correlation method
    (ii) Cross validation
12. 'Validity' refers to the degree to which a measuring tool yields consistent results upon testing and retesting.
13. The types of validity are: (i) face validity, (ii) content validity, (iii) concurrent validity, (iv) construct validity, (v) predictive validity and (vi) criterion validity.
14. Content validity refers to the extent to which a test contains items representing the behaviour that we are going to assess.
15. Concurrent validity refers to the extent to which the test scores correspond to already accepted measures of performance (or status made at the same time).
16. The construct validity of a test is the extent to which the test may be said to measure a theoretical construct or trait.
17. The different types of cross validation are: validity extension, validity generalization and psychometric signs.

3.11 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the characteristics of a good and standard test?
2. What do you understand by the validity of a test? Write a short note on the different types of validity.
3. List the similarities and differences between standardized test and teacher-made test.
4. Write a note on the relationship between validity and reliability.

Long-Answer Questions

1. Explain any two methods of computing reliability in detail.
2. Explain the various methods of validation of a test.

NOTES

3. Give a detailed account on the factors that affect reliability.
4. Give a detailed account on the factors that affect validity.

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NOTES

UNIT 4 CONSTRUCTION AND STANDARDIZATION OF ACHIEVEMENT TEST

Structure

4.0 Introduction
4.1 Unit Objectives
4.2 Norms in Measurement: Definition and Significance
  4.2.1 Types of Norms
4.3 Classification of Tests
  4.3.1 Standardized Achievement Tests
  4.3.2 Teacher-Made Test
4.4 Summary
4.5 Key Terms
4.6 Answers to 'Check Your Progress'
4.7 Questions and Exercises
4.8 Further Reading

4.0 INTRODUCTION

Tests and other means for measuring progress of the learners serve as a basis for instructional decisions of educators. Precisely for this, the teacher is supposed to prepare good quality tests to bring out the understanding and achievement capacity of the learners. A good test should have qualities such as validity, reliability and usability. The assessment instrument should include psychometric characteristics (difficulty, discrimination and destructor indices). It has been understood through various studies that there is a need for constructing standardized achievement test for learners. One frequent use of standardized achievement tests is to identify students who perform below, at the same level, or above their peers through uniform procedures in scoring, administering and interpreting results.

Norm-referenced testing is considered an important part of psychological and educational testing. This method is largely statistical and works on the assumption that human traits and characteristics, such as intelligence, academic achievement and behaviour, are distributed along a normal probability or bell-shaped curve or normal curve. A normal curve is used to represent the average or standard performance level of a sample population and also the exceptions to the norm (over or below average). The norms for a test are percentile ranks, standard scores and other statistics for the norm group on the basis of which the test standards are formulated. A certain percentage of the norm group falls within various ranges along the normal curve. Based on the range within which test scores fall, scores may be rated as ranging from poor to superior.

In this unit, you will learn about norms in measurement and classification of tests, such as standardized tests and teacher-made tests.

4.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Define norm
- Discuss different types of norms
- Explain the different types of achievement tests
- Discuss the steps of constructing achievement tests

4.2 NORMS IN MEASUREMENT: DEFINITION AND SIGNIFICANCE

In words of American psychologists Thorndike and Hagen, 'Norms are defined as the average performance on a particular test made by a standardization sample'. Frank S. Freeman defines a norm in measurement as 'the average or standard score on a particular test made by a specified population'.

Norms are representations of average performance based upon the results of testing a specified group of students. It is a device of transforming raw scores into standard scores in a group. Educational measurement is not a case of physical measurement, but a case of mental measure. Therefore, educational measurement is relative. In case of this, we have to go for the evaluation of an individual in relation to other in a class or a group. Let us take an example. Suppose Prakash is a student of Class X. In the classroom examination, he scored 60 in English and 75 in Mathematics. If a layman analyses the result of Prakash, he will say that Prakash is better in Mathematics than in English. Prakash scored the highest marks in English test but the lowest marks in Mathematics in the class. So the interpretation made by the layman was wrong because the two scores are raw scores.

In order to get a valid and reliable result, we should go for a norm, through which we can get the perfect place of an individual in a group. For this purpose of interpretations, the raw scores are to be converted into derived scores. Norms tell us where a student or a class stands in relation to a reference group. Norms are representation of average performance based upon the results of testing a specified group of students. It is a statistical procedure to minimize the interpretive error of a test score. The norms of any educational test represent the average test performance of the standardized group or sample selected from a specified population. In this, an individual score is compared with the standardized sample as a reference group. The importance of norms in the field of measurement and evaluation are explained as follows:

- Norms are the basis of interpreting raw scores into derived scores.
- Norms place an individual in the exact place within a group.
- Norms are helpful for selection and classification of students.
- Norms are helpful in provision of guidance and counselling the students.
- Norms speak about the attainment of instructional objectives by the students.
- Norms help in minimizing the interpretive error of a measuring instrument.

4.2.1 Types of Norms

In the field of educational and mental measurement, we use four types of norms, which are as follows:

1. Age norm

The concept of age norm was developed by French psychologist Alfred Binet in 1908. It basically deals with mental age. This age norm is also known as 'mental age norms' or 'age equivalent norms'. The 'age norm' is defined as the average performance of a representative sample of certain age group on the measure of intelligence or ability. Let us consider a suitable example to have clarity about age norms.

Suppose the average score of students of age 15 years 2 months on an achievement test is 80. So the age norm for the score of 80 will be 15 years 2 months. Suppose Mohan is 12 years old and he scores 80 in the achievement test. Here, though his chronological age is 12, Mohan's mental age is 15 years 2 months.

So, when that age norm is fixed, standardized test is given to a representative sample of students of a particular age level and the average score is calculated, and this score is considered as the norm for the group. The students who achieve that score are considered within that age norm.

Limitations of age norm

The limitations of age norm are as follows:

- It is very difficult to get a true representative sample of individuals of a selected age group.
- In case of very high and very low scores, it is difficult to interpret it with age norms.
- Mental age units are not fixed in case of different tests; it may vary.
- It has the limited scope to be used in some psychological and educational tests.
- Age norms lack a standard and uniform unit throughout the period of growth of physical and psychological traits.
- It is the difficult and a time consuming task to develop the age norms and mental age.
- The mental age of a particular age group may differ from locality to locality and test to test.

2. Grade norm

Grade norms are also like age norm. However, here, measurement is based upon class or grade level, not on age level. Grade norms have been widely used with standardized achievement tests, especially at the elementary school level. The grade equivalent that corresponds to a particular raw score is identified as the grade level at which the typical student obtains that raw score. A grade norm corresponding to a raw score is the grade level of those pupils whose average raw score is the raw score in question.

Suppose we conducted a test on the VIIIth grade students. After getting the result, we get 60 to be the average of that test. Therefore, 60 will be the grade norm for the students of VIIIth grade. Grade norms are based on the average performance

of students at various grade levels. Grade norms are most useful for reporting growth in the basic skills during the elementary school period. They are least useful for comparing a student's performances on different tests.

Limitations of grade norms

The limitations of grade norms are as follows:

- The rate of growth from grade to grade is not uniform throughout.
- Grade norms lack a comparability of scores on different tests.
- When a student of VIIth grade gets a credit of IXth grade, it does not mean that the student has the ability to be a student of IXth grade.
- Fractional grades do not have any meaning.
- Grade norms are affected by quality of schools, quality of teachers and quality of students.
- The interpretation of grade norm is very confusing because it provides only level of performance with respect to a subject rather than the educational level of the students.

3. Percentile norm

Percentile norms are about the position of an individual in relation to the norming group. 'Percentile norm' is a point on the scale of measurement determined by the percentage of individuals in given populations that lie below this point. It describes a student's performance in terms of the percentage of other students in some clearly defined group that earn a lower score. This might be a grade or age group, or any other group that provides a meaning comparison. If the percentile norm of a score 60 is 65, we mean that 65 per cent of the students of the normative group lie below a score of 60.

Percentiles should not be confused with the common 'percentage score'. The percentage scores are raw scores, whereas percentiles are transformed scores. It provides a basis for interpreting an individual's score on a test in terms of his own standing in a particular standardization sample. It should be based upon a sample which has been made homogeneous with respect to age group, sex group grade level, socio-economic status, etc. This is applicable for all types of tests: intelligence, attitude, aptitude and achievement.

Limitations of percentile norm

- The percentile units are not equal on all parts of the scale. The percentile difference of 5 near the middle of the scale (e.g., 45 to 50) represents a much smaller difference in test performance than the same percentile difference at the ends (e.g., 85 to 90), because a large number of students receive scores near the middle, whereas relatively few students have extremely high or low scores.
- Percentile norms are generally confused with percentage scores which affects the interpretation.
- Percentile norm indicates only the relative position of an examinee in the standardization sample. It conveys nothing regarding the amount of the actual difference between the scores.

- Percentile rank of one group cannot be compared with percentile rank of another group.
- Conversion of raw scores to percentile scores give more differences in the middle than at the extremes.

We can use the following formula to compute percentile rank of raw scores:

$$PP = L + \frac{P_n - f_b}{f_a} \times i$$

where PP = Percentile point of a raw score

L = Lower limit of the raw score falls in the particular class interval

P_n = Percentage of the frequency

f_b = Frequency below the class interval

f_a = Actual frequency of the class interval

i = Size of the class interval

4. Standard score norms

The most important method used to indicate an individual's relative position in a group by showing how far his achieved score is above or below average. This is the approach of standard score and standard scores express performance of the individuals in terms of standard deviation units from the mean. There are numerous types of standard scores used in testing. They are as follows:

(a) ***Z-Scores:*** Z-score represents test performance directly as the number of standard deviation units a raw score is above or below the mean. The Z-scores are the units of normal probability curve, ranges from -3σ to $+3\sigma$, with mean value zero and standard deviation one.

The formula for computing Z-score is $= \frac{X - M}{SD}$

Where,

X = Raw score

M = Arithmetic mean of raw scores

SD = Standard deviation of raw score

A Z-score is always negative when the raw score is smaller than the mean.

(b) ***T-Scores:*** T-scores are also the standard scores but the mean value is 50 and standard deviation is 10. T-scores can be obtained by multiplying the Z-score by 10 and adding the product to 50. Thus,

$$T\text{-score} = 50 + (10\ Z)$$

One reason that T-scores are preferred to Z-scores for reporting test results is that only positive integers are produced in T-scores.

(c) ***Stanines*:** The stanine norm is developed by the technique of normalized standard scores. It was developed by the US Air Force during the World War II. Stanines are single digit scores ranging from 1 to 9. This system of scores is so-called because the distribution of raw scores is divided into nine equal parts.

Stanine 5 is in the centre of the distribution and includes all cases within one-fourth of a standard deviation of either side of the mean. Here, the mean score is 5 and standard deviation is 1.96 or 2. When raw scores are transformed into stanine scores, the distributions of scores take the shape of normal curve.

In the Stanine system, a 9-point scale is used, in which 9 is high, 1 is low and 5 is average. Stanines are normalized standard scores that make it possible to compare a student's performance on different tests.

The stanines are distributed on normal curve. The area of normal probability curve has been divided into nine standards with a fixed percentage. The first stanine includes 4 per cent, second stanine includes 7 per cent, third stanine includes 12 per cent, fourth stanine includes 17 per cent, fifth stanine includes 20 per cent, sixth stanine includes 17 per cent, seventh stanine includes 12 per cent, eighth stanine includes 7 per cent and the ninth stanine includes 4 per cent of the total cases.

Stanine	*Description*	*Percentage*	*Stanine's position*
1, 9	Bottom and top	4	(lst) (9th)
2, 8	Above bottom and below top	7	(2nd) (8th)
3, 7	Near to second or eighth	12	(3rd) (7th)
4, 6	Above or below mean	17	(4th) (6th)
5	Middle or mean	20	(5th)

Judging the adequacy of norms

- Test norms should be relevant to the reference group.
- Test norms should be comparable with other norms.
- A clear description is necessary for every test norm.
- Test norms should be changed from time to time.
- Test norm should represent the whole group.

Limitations of standard score norms

The limitations of standard score norms are as follows:

- The interpretation of the standard scores becomes problematic when the distribution is not normal.
- It needs expertise knowledge to deal with the standard scores.
- The minus values are very confusing in case of educational and mental measurement.
- Sometimes the raw scores are not normally distributed; they are positively skewed or negatively skewed. This linear transformation is based on the assumption of normal distribution.

Check Your Progress

1. State the three characteristics of a good test.
2. What are the four types of norms?
3. Name the three types of standard scores used in testing.
4. What formula is used for calculation of Z-score?

4.3 CLASSIFICATION OF TESTS

Tests are divided into different types taking into consideration their content, objective, administration system, scoring style, etc. According to mode of administration, tests are of two types:

(i) **Individual test:** When a psychological test is administered on an individual at a particular time, it is known as 'individual test'.

(ii) **Group test:** When a test is administered on a group of individuals at a particular time, it is known as 'group test'. It is mostly applicable on adult literates.

According to the ability of the student, tests are of two types:

(i) **Speed test:** This type of test is applicable on the individuals to know the mental speed. Here, the time is limited and the number of questions is more and all the questions are equal in difficulty level. Railway examinations, banking examinations are examples of speed test.

(ii) **Power test:** This type of test is applicable on individuals to know their mental power or their ability. Here, there is no time limit and the individuals are expected to answer the questions within as much time they like. All the questions of this test are arranged according to difficulty level and discriminating power. The essay competitions by the media are the bright examples of power test.

According to the type of items involved in the test, it can be of three types:

(i) **Essay-type test:** Essay-type tests are otherwise known as open-ended tests. The essay question is especially useful for measuring those aspects of complex achievement that cannot be measured well by more objective means. These include: (a) the ability to supply rather than merely identify interpretations and application of data and (b) the ability to organize, integrate and express ideas in a general attack on a problem. Outcomes of the first type are measured by restricted-response questions and outcomes of the second type by extended-response questions. For example, 'discuss the educational philosophy of M. K. Gandhi'.

(ii) **Short-answer type test:** This type of test requires to be written in a short-cut manner regarding a concept. It is suitable for measuring a wide variety of relatively simple learning outcomes, and it is used almost exclusively to measure the recall of memorized information. For example: 'What is measurement? Write within 50 words.'

(iii) **Objective-type test:** In objective-type questions, the individual is expected to answer the question with the help of a word, a phrase, a number or a symbol. The test with multiple-choice items, true-false items, matching type items, fill-in-the blanks items, one-word substitution are the examples of objective type test.

According to the method of scoring, tests are of two types:

(i) **Machine-scored test:** The tests which are scored or assessed by the machines like computer are known as 'machine-scored test'. The Bank P.O. examination is an example of machine-scored test.

(ii) **Hand-scored test:** The tests which are assessed by the human beings are known as 'hand-scored tests'. The classroom achievement tests is an example of hand-scored tests.

According to the principle of test construction, tests are of two types:

(i) **Teacher-made test:** Generally 'teacher-made tests' are prepared by classroom teachers to assess pupils' growth. It is related to action research. Teacher-made tests serve different purposes, viz., to measure pupil's achievement, to know how far the specific objectives have been fulfilled, to diagnose the learning difficulties, and to arrange specific remedial measures to award grades, etc. This type of test only follows two steps—planning and preparation.

(ii) **Standardized test:** Standardized tests measure the common objectives of a wide variety of schools. They have standard procedures for administration and scoring, and provide norms for interpreting the scores. A test manual and other necessary material are typically provided to aid in the administration of the test and the interpretation and use of the results. The test items are generally of high quality because they have been prepared by specialists, subject experts, pre-tested and selected on the basis of their effectiveness and their relevance to a rigid set of specification. They are especially useful for measuring general educational development, determining student's progress from one year to the next, grouping students, analysing learning difficulties, and comparing achievement with learning ability.

Standardized test and teacher-made test have been discussed later in this unit in detail.

According to the nature of the test, they are classified as follows:

(i) **Oral test:** It is a kind of verbal test. In oral test, the individual is expected to answer orally. This type of tests is mostly applicable to illiterates or small children. In the public survey, the people are asked to speak something regarding the issue. In the interview board, the interviewers ask questions to the interviewee and the interviewee answers orally. This type of test is known as 'oral test'.

(ii) **Written test:** Here, the individual has to respond the questions in writing form. So the respondent should have the writing ability. It is only applicable upon the literates. All the written examinations are the examples of written test. It is a kind of verbal test.

(iii) **Performance test:** This type of test is also known as 'non-verbal test'. The respondent is not expected to respond verbally. He has to perform the task. The running competition, jumping competition held by physical examination are the examples of performance test.

According to Robert Glaser, tests are of two types:

(i) **Norm-referenced test:** It is a test, or type of assessment, designed to provide a measure of performance interpretable in terms of an individual's relative standing in some known group. For example, Ram types better than 80 per cent of the class members. Norm-referenced interpretations depend on a comparison of a student's performance to that of other students whose performance defines the norms. The norms might be based on a local, state or national group, depending on the use to be made of the result. The norm-reference interpretation indicates the student's relative standing in a norm group by noting the percentage of students in the group who obtain the same or a lower score (called percentile score). An identifying feature of norm-referenced test is the selection of items of average difficulty and the elimination of items that all students are likely to answer correctly. This is useful for decisions based on relative achievement such as selection, grouping and relative grading.

(ii) **Criterion-referenced test:** It is a test, or type of assessment, designed to provide a measure of performance interpretable in terms of a clearly defined and delineated domain of learning tasks. For example, Prakash types 80 words per minute without error. When interpretations are confined to the attainment of a specific objective, they are called objective referenced or criterion-referenced interpretation. Current-standard based assessments provide major example of criterion-referenced interpretations. The criterion-referenced interpretation focuses on the percentage of items answered correctly (called percentage on the correct score). Criterion-referenced tests include items that are directly relevant to the learning outcomes to be measured, without regard to whether the items can be used to discriminate among students. No attempt is made to eliminate easy items or alter their difficulty. The goal of the criterion-referenced test is to obtain a description of the specific knowledge and skills each student can demonstrate.

4.3.1 Standardized Achievement Tests

When the concept of evaluation takes its place in a wider view, we talk about standardized tests. Standardized tests may be standardized achievement tests, standardized intelligence test, etc. Mostly, we talk about standardized achievement tests in the teaching-learning situation.

Standardized achievement tests are typically norm-referenced tests that measure the students' level of achievement in various content and skill areas by comparing their test performance with the performance of other students in some general reference group (i.e., a nationwide sample of students at the same grade level). Standardized tests are prepared by the subject experts and they have more validity and reliability in comparison to teacher-made tests.

The quality of items in standardized tests is very high. The items are formulated by specialists, pre-tested and selected on the basis of effectiveness. The reliability of standardized tests is very high commonly between 80 and 95, frequently around 90. During the procedure of standardization of a test, some specific instructions are followed by the subject experts. The scores obtained by the test can be compared with those of norm groups.

Characteristics

The characteristics of standardized tests are as follows:

- The test items are of a high technical quality with validity and reliability.
- The items are developed by subject experts.
- The items are pre-tested and selected on the basis of difficulty and discriminating power.
- Directions for administration are given in these tests.

- Scoring key is provided to the examiners during scoring of papers.
- Norms based on national samples of students in the grades, where the test is intended for use is provided as aid in interpreting the test scores.
- A test manual and other necessary accessory materials are included as guides for administering and scoring the test, evaluating its technical qualities, interpreting, and using the results.
- The reliability of standardized tests is generally around 90.
- Derivation of norms is a part of the process of standardization.
- Standardized tests generally follow four steps, viz., planning, preparation, try-out and evaluation.
- In case of standardized tests, usually objective type items are used.
- All the items of a standardized test are arranged from lower difficulty level to higher difficulty level.
- Standardized tests are useful for basic or fundamental research.

In case of standardized tests, the process of standardization includes all the following elements:

- Standardization of the content
- Standardization of methods of administration
- Standardization of methods of scoring
- Standardization of process of interpretation

Steps

A teacher-made test follows only two steps (planning and preparation) in its construction, but standardized test follows four steps for its construction as discussed in this section.

1. **Planning of the test:** At the planning stage, the subject experts plan about the whole test. This contains the following elements:
   - Number of units to be covered by the test
   - Types of questions to be included in the test
   - Instructional objectives that are going to be tested
   - Number of items to be included in the test
   - Total marks to be given to the test
   - Instructions that are to be given in the test
   - Preparation of a scoring key

   Everything regarding the test is planned during this stage. A blueprint is prepared for the test which contains contents, objectives, the type of questions, and the weightage to be given to different content areas according to the type of items and objectives. If a test is to be successful, a careful planning must precede its construction.

(ii) Preparation of the test: The second step in the construction of a standardized test is preparation. At this stage, the following points are taken into consideration:

- Types of test items
- Directions to test items
- Directions for administration and scoring
- Question-wise analysis chart

Planning stage is the theoretical concept of a standardized test, but preparation stage is a practical concept. In this stage, all the items and instructions are prepared by the subject experts.

(iii) Try-out of the test: During the try-out step, some samples are collected to administer the same test upon them. Sometimes, both preliminary try-out and final try-out are followed to make the test items more valid and reliable. This try-out step helps in finalizing the number of items to be included in the final test.

Let us take an example to make a clear-cut understanding about this step. Suppose a standardized test is to be prepared for the class X students of Assam. After preparing all the items, the test should be administered on a sample of Xth class students of Assam. This try-out test helps in rejecting the poor items improving the items which need improvement, finalizing the number of items to be included in the final draft of the test. After the try-out form of the test is administered, the answer sheets are scored as per the scoring key. Now the scores are ready for item analysis and evaluation of the test.

(iv) Evaluating the test: At this stage, the scores of the items are ready for evaluation. Whether the items are valid or not, good or poor, reliable or not, everything is determined in this stage. For the purpose of evaluation, the following points are followed:

- Analysing the items to consider their value of inclusion in the final test
- Determining the validity and reliability of the test
- Assessing the objectivity and usability of the test

After all these steps, the final draft of the test is prepared. In the final draft, the items of good validity, objectivity usability and reliability, appropriate difficulty level and satisfactory discriminating power are retained.

4.3.2 Teacher-Made Test

Evaluation is the part and parcel of teaching-learning situation. How far the instructional objectives have been achieved, how far the curriculum and methods of teaching is suitable for the students, and other such things can be known through the process of evaluation. Test is a tool for evaluation. In the classroom situations, the teachers develop tests to measure and evaluate students' achievement. Different subject teachers construct different tests for their students. Teacher-made tests serve the purposes, viz., measure achievement of the students, know how far the specific objectives have been fulfilled, diagnose the learning difficulties, arrange specific remedial measures, award grades, etc. Teacher-made tests are based on content and objective specific to teacher's own class or school. It may deal either with a specific limited topic or skill or with larger segments of knowledge and skill. Generally, the teacher-made tests are less reliable in comparison to the standardized test. It has a limited use, to a particular class or a single school. Teacher-made tests are well adapted to outcomes and content of local curriculum.

Flexibility affords continuous adaptation of measurement to new materials and changes in procedure. It too often neglects complex learning outcomes.

The quality of items of the teacher-made tests is lower than standardized tests because of a teacher's limited time and lack of opportunity to pretest items. The score comparisons and interpretations of teacher-made tests are limited to local school situation. Teacher-made tests evaluate student's day-to-day progress and their achievement on work units of varying size.

Standardized tests follow four steps for its construction, but teacher-made tests follow only two steps for its construction. Such tests do not need rigorous process of standardization. They are not subjected to rigorous item analysis, not evaluated for their validity and reliability. Simply, teacher-made tests go through two stages, viz., 'planning' of the test and 'preparation' of the test.

Mostly, teacher-made tests are used for formative evaluation. A teacher-made test may be a full-fledged achievement test covering the whole course of a particular subject or a unit test covering one unit of study. The results of teacher-made tests are useful for action researches. The teacher-made tests are evaluated by the same teacher, who makes the test papers. These tests if skillfully prepared can even serve the purpose of standardized tests. Table 4.1 differentiates between teacher-made tests and standardized tests.

***Table 4.1** Comparison of Teacher-Made Tests and Standardized Tests*

Teacher-made tests	***Standardized tests***
Teacher-made tests are prepared by the classroom subject teachers.	Standardized tests are prepared by the subject experts.
Teacher-made tests follow two steps: planning and preparation.	Standardized tests follow four steps: planning, preparation, try-out and evaluation.
Teacher-made tests are useful for the concerned classroom only.	Standardized tests are useful all over the world.
Teacher-made tests are useful for action research.	Standardized tests are useful for basic or fundamental research.
The items are not arranged according to their difficulty level.	The items are arranged according to their difficulty level.
The scores of the teacher-made tests have limited comparison value and their interpretations are limited to local school situation.	The scores of standardized tests can be compared with those of norm groups.
The reliability of teacher-made tests are usually unknown, but can be high if carefully constructed.	The reliability of standardized tests is high, commonly between 80 and 95, frequently around 90.
The quality of items is unknown unless test item file is used.	The quality of items is very high.
Scoring key is not used.	Scoring key is very necessary and hence used.
In case of teacher-made tests, there may or may not be objective type tests.	In case of standardized test, usually objective type tests are used.
Take less time for construction and experts may not be involved in it.	Tests involve so many experts, use so many sophisticated procedures and thus take a long time for construction.
Based on content and objectives specific to teacher's own class or school.	Based on content and objectives common to many schools throughout the country.

4.4 SUMMARY

In this unit, you have learnt:

- Standardization of a test requires the important characteristics, i.e., validity. If the objectives of a test are fulfilled, then we can say that the test is a valid one.
- Usability refers to the degree to which the test can be successfully used by the teachers/evaluators.
- Interpretability of test refers to how readily the raw scores of the test can be derived and understood.
- The norms of any educational test represent the average test performance of the standardized group or sample selected from a specified population. In this, an individual score is compared with the standardized sample as a reference group.
- Percentile norm is a point on the scale of measurement determined by the percentage of individuals in a given population that lies below this point.
- The percentage scores are raw scores, whereas percentiles are transformed scores.
- An identifying feature of norm-referenced test is the selection of items of average difficulty and the elimination of items that all students are likely to answer correctly.
- The goal of the criterion-referenced test is to obtain a description of the specific knowledge and skills each student can demonstrate.

4.5 KEY TERMS

- **Age norm:** It is the average performance of a representative sample of certain age group on the measure of intelligence or ability.
- **Norms:** Defined as the average performance on a particular test made by a standardization sample.
- **Percentile norm:** It is a point on the scale of measurement determined by the percentage of individuals in given populations that lie below this point.
- **Speed test:** This type of test is applicable on the individuals to know the mental speed.

4.6 ANSWERS TO 'CHECK YOUR PROGRESS'

1. The three basic characteristics of a good test are: (i) validity, (ii) reliability and (iii) objectivity.
2. The four types of norms are: (i) age norm, (ii) grade norm, (iii) percentile norm and (iv) standard score norm.

Check Your Progress

5. What are the types of test according to the ability of the students?
6. What are standardized tests?
7. In the process of standardization, which elements are standardized?
8. Name the four steps involved in the construction of a standardized test.

3. There are three types of standard scores used in testing. These are as follows:
   (i) Z-Score
   (ii) T-Score
   (iii) Stanines

4. Z-Score is calculated as $\frac{X-M}{SD}$

5. Two types of test according to the ability of the students are: (i) speed test and (ii) power test.

6. Standardized tests measure the common objectives of a wide variety of schools, have standard procedures for administration and scoring, and provide norms for interpreting the scores.

7. The process of standardization includes these elements:
   - Standardization of the content
   - Standardization of methods of administration
   - Standardization of methods of scoring
   - Standardization of process of interpretation

8. Standardized tests follow four steps for its construction: (i) planning, (ii) preparation, (iii) try-out and (iv) evaluation.

4.7 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the characteristics of a good and standard test?
2. Differentiate between grade norm and percentile norm.
3. What are the characteristics of standardized test?
4. Name the different classification of tests.

Long-Answer Questions

1. Write a detailed note on norms in measurement.
2. Discuss in detail the steps of construction of standardized test.
3. List the similarities and differences between standardized test and teacher-made test.
4. What are the characteristics of a standardized test?
5. Write in detail the disadvantages of age norm and grade norm.

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UNIT 5 ATTITUDE SCALE

Structure

5.0 Introduction
5.1 Unit Objectives
5.2 Defining Attitude
  5.2.1 Measuring Attitude
  5.2.2 Significance of Attitude Testing
5.3 Method of Construction and Standardization of Attitude Scale
  5.3.1 Thurstone Scale
  5.3.2 Likert Scale
5.4 Summary
5.5 Key Terms
5.6 Answers to 'Check Your Progress'
5.7 Questions and Exercises
5.8 Further Reading

5.0 INTRODUCTION

Attitude is the base which determines the success or failure experienced by individuals. People do not differ much in terms of physique or intellect. However, attitude is the factor that makes a big difference. Two individuals can differ in attitudes (one being a pessimist and the other, an optimist) in spite of having the same background, education, skill and intelligence. It is all a matter of different attitudes. One's interests are a reflection of choices and occupations of interest. If people select a profession linked to their interests, they will enjoy doing their work and derive pleasure from it.

In this unit, you will learn about attitude measurement, the purpose behind it and its limitations. You will also learn about Thurstone scale and Likert scale for measuring attitude.

5.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Define attitude
- State the importance of attitude scaling
- Describe the methods of attitude measurement
- Discuss Thurstone and Likert scaling

5.2 DEFINING ATTITUDE

L. L. Thurstone, a pioneer in the fields of psychometrics and psychophysics, states that attitude 'is the degree of positive and negative affect associated with some psychological object'. Attitude refers to the predisposition of an individual to evaluate some aspect of his world, including ideologies, objects, symbols, and people. Attitude is the bent of mind that may be positive, negative, hostile or indifferent. One's attitude is reflected in his

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behaviour. In a nutshell, attitude includes the sum-total of an individual's inclination, feelings, prejudice or bias, preconceived notions, ideas, fears, threats and convictions about something.

For example, somebody's attitude towards Indian culture means the person's positive inclination towards the Indian culture. Social attitudes can be learnt from the society through interaction with the social members. Attitude of an individual changes from time-to-time and it is not an inborn quality, rather it is acquired.

American psychologist Anne Anastasia states, 'An attitude is often defined as tendency to react favourably towards a designated class of stimuli, such as a national or racial group, a custom or an institution. Thus defined, attitude cannot be directly observed but must be inferred from overt behaviour, both verbal and non-verbal.'

Psychologist Frank S. Freeman states 'An attitude is a dispositional readiness to respond to certain situation, persons or objects in a consistent manner which has been learned and has become one's typical mode of response. An attitude has a well-defined object of reference. For example, one's view regarding a class of food or drink (such as fish and liquors), sport, maths or democrats are attitudes.'

Characteristics

The characteristics of attitude are as follows:

- It is not inborn but acquired
- Differs from culture-to-culture
- Are integrated into an organized system
- Less consistent and can be modified
- Is a position towards outer objects, either 'for' or 'against'
- Are socially learned
- Formed due to the process of differentiation
- Attitudes are complex
- Have readiness to respond
- Has a time dimension
- It has a duration factor
- It is predisposition towards objects
- Observed from overt behaviour
- Is a well-defined object of reference
- It implies a subject–object relationship

Types

The predispositions towards different things create different attitude. Attitude of a person varies from situation to situation and from time-to-time. Some people have positive attitude towards religious thoughts and morality, but some have negative attitude towards it. In general, attitude is of two kinds: (i) positive attitude and (ii) negative attitude. For example, Gandhi was interested in non-violence, so he had positive attitude towards non-violence. On the other hand, he was against violence, so he had negative attitude towards violence. Besides this kind of classification, attitude may be classified into different categories like:

- Acquisitive attitude
- Playful attitude
- Scientific attitude
- Business attitude
- Artistic attitude
- Religious attitude

People who have interest in acquisition of something all the time, they have acquisitive attitude. All the time, they are in search of something. Play attitude refers to the interest in playing. People with playing attitude give importance to playing. Some people are more inclined towards science and technology from childhood and involve themselves in small scientific activities. They have a scientific bent of mind and this is known as 'scientific attitude'. Some people are interested in commerce and business activities. This refers to their business attitude. People with skill in art and craft, have an artistic attitude. They have interest in artistic things, arts and crafts, etc. Religious attitude refers to people having a religious bent of mind and like to involve in religious activities. People with religious attitude believe in different forms of God, and they are known as theists. But people who do not believe in God and religion are known as atheists. They do not like to involve themselves in religious activities.

Determinants

Attitude is not an inborn quality. At the time of birth a child's mind is like a clean slate but gets eventually influenced and moulded according to the society and environment in which they live. Interacting with parents, peer group, siblings, neighbours, society and schoolmates a child develops his/her attitude towards an individual or object or anything else. So there are certain factors which determine the attitude of human beings. The determinants are as follows:

(a) **Cultural or social determinant:** A child acquires everything from culture or the society to which he/she belongs. The cultural ethics, social norms, ceremonies, religious and moral beliefs of the particular society are acquired by the child. His attitude towards something is framed according to that social or cultural framework. For example, a tribal child receives all aspects of tribal culture, language, thinking, education, and other such things from the tribal society in which he lives. For example, if a particular tribe considers that people who do not belong to their tribe are alien to them and they destroy their culture and civilization. So, the child of this tribe will also develop this kind of attitude towards the people who do not belong to their tribe.

(b) **Psychological determinants**: One's psychology determines one's attitude. A person who is kind and merciful will have a sympathetic attitude towards the poor. Emotional and personal experiences and social perception contribute towards development of attitude.

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(c) Functional determinants: Functional determinants are also known as situational determinants. Sometimes, a situation builds attitude in human minds. For example, when somebody is rebuked and mistrusted by his/her friends in a particular situation contributes to his/her change of attitude towards the friends. Such situational factors are responsible for development of attitudes.

5.2.1 Measuring Attitude

Attitude is a subjective concept which is not absolute but is rather relative. So, when test is prepared for testing attitude, certain dimensions are to be kept in mind. The dimensions are as follows:

- Direction
- Degree
- Intensity

From the direction point of view, there are two kinds of directions: (i) positive and (ii) negative. When an individual has positive bent of mind towards something, it is it is known as 'positive attitude' and when he has a negative bent of mind towards something it is known as 'negative attitude'. Every student's attitude should be measured in relation to teaching–learning situation.

Every attitude has its degree. For example, a person who sings occasionally has less degree of positive attitude towards singing in comparison to the person whose profession is singing. So at the time of measuring attitude, the degree of predisposition should be taken into consideration. Attitudes also have an intensity dimension.

The methods to be followed for the measurement of attitude are as follows:

(i) Thurstone scale: This scale was developed by L.L. Thurstone. Thurstone's attitude scale is known as equal-appearing interval scale. In this scale, both favourable and unfavourable statements regarding a particular topic are reflected in an eleven point scale. The respondent is supposed to check the point for each item according to his attitude. The median of the judged locations for an item is its scale value. The scale positions are a function of the judges who are chosen.

(ii) Likert scale: This scale was developed by Likert. All the items of this scale are followed by five options. The respondents are supposed to point out the option they like. The decisions are either favourable or unfavourable on the object, or person. Judges are not appointed for this scale, and this scale is known as 'five-point scale'. Likert type scale is less time consuming and economic. Its approach is more empirical because, it deals with the respondent's score directly rather than employing judges. The sum of the item credits is the total score of the individuals, which is interpreted in terms of empirically established norms.

Example of Likert type scale:

1. 'Science is the soul of present day society'.	Scales	5	4	3	2	1
	Values	SA	A	U	D	SD

Values:

SA	–	Strongly Agree	5
A	–	Agree	4
U	–	Undecided	3
D	–	Disagree	2
SD	–	Strongly Disagree	1

5.2.2 Significance of Attitude Testing

Behind every action, there is purpose. When we go for testing attitude of people or students, obviously there are some purposes behind it. In teaching–learning situation, attitude testing has an important role to play. So the purposes of attitude testing are as follows:

- To assess the entry attitude of the students towards a particular course
- To assess how far the desirable attitudes have been developed in the students during the course and after the completion of the course
- To help students to develop positive attitude towards certain things
- To help students in their career plan
- To help management to make its administration and supervision a qualitative one
- To help teachers to overcome their weakness in the teaching–learning situation
- To help students to check their undesirable behaviours

Limitations of Attitude Testing

Attitude testing has certain limitations which cannot be avoided. The limitations are as follows:

- Attitude is a subjective concept, so it is very difficult to measure attitude quantitatively
- Attitude is such a complex affair that it cannot be represented by any single numerical index
- Attitude is learned not inborn. So it varies from situation to situation and time to time
- In most of cases, it is seen that there is difference between verbally expressed attitudes and attitudes reflected in behaviour

5.3 METHOD OF CONSTRUCTION AND STANDARDIZATION OF ATTITUDE SCALE

While it seems that the easiest way to find out someone's opinion about something would be to just ask them, it is not always that simple. It becomes complicated because attitude is an outcome and an influence on self-image and social acceptance and people may sometimes resort to dishonesty in order to hide their true nature or just appear likable. In the quest to be socially accepted and desirable, people may give the answers they feel that the questioner wants to hear. Since the truth of an opinion can never be ascertained,

Check Your Progress

1. What is attitude?
2. State three important types of attitudes.
3. What are the determinants of attitude?

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measuring attitude becomes very difficult. Many different approaches have been offered and none of them are foolproof. Usually an attitude test assesses the three different components of attitude-cognitive, affective and behavioural.

5.3.1 Thurstone Scale

Thurstone scales are actually a group of activities used to create attitude scales. These activities were one of the earliest systematic techniques formulated to measure attitudes. Louis L. Thurstone, in 1928, developed the law of comparative judgment. This law proved that attitude is measurable even though it is not a tangible entity.

The three different attitude-scaling techniques propounded by Thurstone were the method of equal-appearing intervals, the method of paired comparisons, and the method of successive intervals. Thurstone believed that attitudes were multifaceted and complex and could not be accorded a single static value. They had to be distributed along a range which was dynamic.

This proved that attitude cannot be represented by a single number. In order to identify that range, psychologist Robert Thurstone came up with the method of equal-appearing intervals. This method makes up for the deficiency of the Likert scale by taking into account the strength of individual items when calculating the attitude score and allowing for neutral opinions.

Constructing the scale

Step 1: You should be very sure of what aspect you would like to measure. Then, create sample statements that could be possible opinions about that aspect. The statements should range from highly favorable to highly unfavorable.

For example, the issue under consideration is caste reservation system allowed by the government. Some sample statements could be:

'It is highly unacceptable for one part of the society to have more privileges than others.'

'There is nothing wrong with it.'

'Reservation system provides equal opportunities to the backward classes.'

'It is a legitimate way of bringing equality into the education system.'

'It promotes inequality and frustrates the regular youth.'

Step 2: The next step is to evaluate each statement by assigning it a number from 1-11, with 1 being very negative and 11 being very positive. The number would indicate the attitude of the statement. The aim here is to have statements that represent every kind of attitude possible for one chosen issue. After all such statements have been crafted and selected, the rest can be discarded.

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So, let's assume that the average ratings among our judges are as below:

Statement	Average
'There is nothing wrong with it.	6.8
Reservation system provides equal opportunities to the backward classes.	2.4
It is a legitimate way of bringing equality into the education system.	1.3
It is highly unacceptable for one part of the society to have more privileges than others.	8.4
It promotes inequality and frustrates the regular youth	9.1

After all the respondents have graded the statements, their attitudes can be calculated from their answers. Some issues commonly faced when creating such a scale include (1) it can be very time taking and costly, and (2) It is difficult to identify examples for the mid-points of the scale when the judges are in consensus.

5.3.2 Likert Scale

The Likert scale was introduced by the psychologist Rensis Likert. This scale is psychometric and uses questionnaires to gauge attitudes of respondents regarding specific topics or subject areas.

The difference between these two concepts pertains to the distinction made by Likert between the phenomenon being examined and the means used for recording responses. Since there is a range available for the respondents to choose from, the form is able to capture the intensity of approval or disapproval felt by the responder. Please note that while creating the range, the Likert scale assumes that distances between each set within a range are equal.

In comparison, modern test theory considers the complexity of each item as an aspect to be included in scaling items. Students must remember that there is difference between a Likert item and a Likert scale. The Likert scale is actually the summation of responses on multiple Likert items. Likert items are usually shown along with a graphical analog scale, such as a line on which the range is shown wherein the respondent encircles or ticks the chosen response value. Sometimes, people refer to the items as scales but this should be avoided as it creates confusion. A Likert item is just a statement which the respondent evaluates as per subjective or objective criteria.

The Likert scale is found to be balanced because the range in either direction is uniform. Usually, there are five standard options available, while many experts suggest offering 7 or 9 possible responses. However, recent studies have shown that 5 or 7-point scales produce slightly higher mean scores than the 10-point scale. This difference can make a large difference statistically.

The typical format of a five-level Likert item looks like:

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

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When the Likert scale does not offer the neutral option of 'neither agree nor disagree', it is considered a forced choice method. A lot of evaluators feel that respondents use this option when they are undure of a response and this does not reflect their true opinion.

There is a subtle difference between the responses of 'undecided' and 'neutral'. A study has also found that Likert scales are vulnerable to distortion because respondents may be reluctant to use very strong responses, either favorable or unfavorable and so may go with largely neutral or mildly favorable or unfavorable responses. A respondent may be more intent on portraying himself or herself in a particular manner rather than being honest and for the sake of social desirability give inaccurate responses. To a certain extent, the acquiescence bias is cancelled out due to the availability of all extreme responses but it is much more difficult to take care of the tendency to be neutral and the desire to be socially acceptable.

Scoring and analysis

In a Likert scale, the scoring can be done by summing up all items together or by analyzing each item separately, once the questionnaire has been completed. However, usually, Likert scales are considered to be summative scales. Also, the scale items are largely random and have no numerical or factual basis. They depend on the researcher's state of mind and insight into the subject. Likert items tend to be assigned progressive positive integer values. A Likert scale would mostly have options ranging from 2 to 10 with 5 being the most common number. When we say that items are progressively numbered, it means that each successive Likert item is considered to indicate a 'better' response than the preceding one.

The second significant aspect is if each successive item category is equidistant from the last. For instance, in the given example, it appears that the 'distance' between categories 1 and 2 is equal to the distance between categories 3 and 4. Obviously, if the distances were to vary, it would signal an inherent bias in the scale and not yield reliable answers. For instance, in an item with options 'Poor', 'Average', 'Good', and 'Very Good', the distance is not equal because there is only one unfavorable response and this weighs the items in the favor of a positive response. At the same time, even if the researcher takes care to create what he feels are equidistant categories, the respondent may not feel so. The quality of a good Likert scale is that it would have symmetrical categories with clearly defined qualifiers, in terms of language. Such a scale is likely to have equidistant categories and will be truly an interval-level measurement. This is an important consideration because otherwise the Likert scale would just be an ordinal scale that would lead to information being lost or being unreliable.

It is only wise to sum up the responses to Likert questions if they all use the same scale and the scale is uniform in terms of distance between the response ranges. In the example, the Central Limit Theorem provides for data to be treated as interval data measuring a latent variable. If the summative responses match up to these assumptions, parametric statistical tests like the analysis of variance may be used. To model binary Likert responses directly, they may be represented in a binomial form.

The chi-squared, Cochran Q, or McNemar tests are common statistical procedures used after this transformation. Non-parametric tests such as chi-squared test, Mann-Whitney test, Wilcoxon signed-rank test, or Kruskal-Wallis tests are often used in the analysis of Likert scale data. Consensus-based assessment (CBA) can be used to create an objective standard for Likert scales in domains where there is no universally acceptable objective standard available. CBA may be employed to refine or even corroborate universally accepted norms.

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5.4 SUMMARY

In this unit, you have learnt:

- L. L. Thurstone states that an attitude 'is the degree of positive and negative affect associated with some psychological object'.
- Attitude refers to the predisposition of an individual to evaluate some aspect of his world including ideologies, objects, symbols, people, etc. Attitude is the bent of mind that may be positive, negative, hostile or indifferent.
- Anastasia states, 'an attitude is often defined as tendency to react favourably towards a designated class of stimuli, such as a national or racial group, a custom or an institution. Thus defined, attitude cannot be directly observed but must be inferred from overt behaviour, both verbal and non-verbal'.
- The predispositions towards different things create different attitude.
- Attitude may be classified into different categories like:
  - o Playful attitude
  - o Scientific attitude
  - o Business attitude
  - o Artistic attitude
  - o Religious attitude
  - o Acquisitive attitude
- Attitude is not an inborn quality.
- One's psychology determines one's attitude.
- Functional determinants are also known as situational determinants.
- Attitude is a subjective concept which is not absolute but is rather relative. So, when test is prepared for testing attitude, certain dimensions are to be kept in mind. The dimensions are: Direction, Degree and Intensity
- Thurstone scales are a set of procedures used to construct attitude scales. These procedures were among the earliest systematic methods devised to measure attitudes.
- Louis L. Thurstone developed the law of comparative judgement in the late 1920s. This law proved that attitude can be measured despite lacking a physical dimension.
- A Likert scale is a psychometric scale that employs questionnaires for research. It is the most widely used approach to scaling responses in survey research that the term is often used interchangeably with rating scale, or more accurately the Likert-type scale, even though the two are not synonymous.
- The inventor of the Likert scale was psychologist Rensis Likert.

Check Your Progress

4. What is Thurstone scale?
5. Who invented the Likert scale?

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- A scale can be created as the simple sum questionnaire responses over the full range of the scale. In doing this, Likert scaling assumes that distances on each item are equal. By contrast modern test theory treats the difficulty of each item as information to be incorporated in scaling items.
- Likert scaling is a bipolar scaling method which measures either positive or negative response to a statement. An even-point scale is used sometimes, where the middle option of 'Neither agree nor disagree' is not available.
- Each item of the Likert Scale can be analyzed separately or in some cases item responses may be summed to create a score for a group of items after the questionnaire is completed. Hence, Likert scales are often called summative scales.
- Responses to several Likert questions may be summed provided all questions use the same Likert scale and that the scale is a defensible approximation to an interval scale.

5.5 KEY TERMS

- **Attitude:** It refers to the predisposition of an individual to evaluate some aspect of his world such as ideologies, objects, symbols and people
- **Thurstone scale:** This scale was developed by Thurstone, which is also known as equal-appearing interval scale
- **Likert scale:** A Likert scale is a psychometric scale that employs questionnaires for research
- **Functional determinants:** They are also known as situational determinants which helps to mould attitude of people

5.6 ANSWERS TO 'CHECK YOUR PROGRESS'

1. An attitude is the degree of positive and negative affect associated with some psychological object.
2. The three important attitudes are: (a) acquisitive attitude, (b) play attitude, and (c) scientific attitude.
3. The determinants of attitude are: (a) cultural or social determinant, (b) psychological determinant, and (c) functional or situational determinant.
4. Thurstone scales are a set of procedures used to construct attitude scales. These procedures were among the earliest systematic methods devised to measure attitudes. Louis L. Thurstone developed the law of comparative judgement in the late 1920s.
5. The inventor of the scale was psychologist Rensis Likert.

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5.7 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the different characteristics of attitude?
2. State the purpose of attitude testing.
3. What are the limitations of attitude testing?
4. Explain with the help of an example how society is a determinant of attitude.

Long-Answer Questions

1. Describe the process of measuring attitude.
2. Explain Thurstone scale.
3. Write in detail about Likert scale and state its drawbacks.

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UNIT 6 CONCEPT OF GUIDANCE AND COUNSELLING

Structure

6.0 Introduction
6.1 Unit Objectives
6.2 Meaning of Guidance
- 6.2.1 Definitions
- 6.2.2 Nature
- 6.2.3 Objectives
- 6.2.4 Principles of Guidance
- 6.2.5 Need for Guidance

6.3 Types of Guidance
- 6.3.1 Personal Guidance
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6.4 Meaning of Counselling
- 6.4.1 Nature
- 6.4.2 Scope
- 6.4.3 Types of Counselling
- 6.4.4 Goals and Importance of Counselling

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6.0 INTRODUCTION

Since life is constantly changing in its dynamics and demands on us, we need to be guided, in terms of home life, professional life as well as education. Some people need less guidance than others. But everyone feels the need for guidance and counselling at some point in time. To meet this need, guidance and counselling has gradually developed into a well-planned and scientific subject. Before we go into the more advanced aspects of guidance as a science, it's important to study in detail and various aspects of guidance. In this unit, you will learn about the meaning of guidance, its aims and objectives, its needs, assumptions, nature, principles and scope.

6.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Explain the meaning, function and role of guidance
- Describe the principles of guidance and counselling
- Identify the types of counseling
- Discuss the role of a teacher in guidance and counseling

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- Understand the meaning and types of counselling
- Discuss the goals and importance of counselling
- List the qualities of a good counsellor

6.2 MEANING OF GUIDANCE

The term 'guidance' represents a concept that is neither simple nor easily understood. Guidance is not simply giving directions to someone, and neither does it mean making decisions for an individual because every individual needs to take their own decisions. Guidance also does not mean carrying other people's burdens, but rather, to support and encourage a person to an extent where they are able to develop their own opinions, have an individual point of view and deal capably with life's challenges. Guidance is assistance made available by professionally qualified and adequately trained men and women to individuals of all ages.

Guidance is an old concept but is still developing. It is still largely an unorganized and informal process in many places, such as when guidance is sought from parents, grandparents, astrologers, palmists, numerologists and so on. However, lately, schools have begun employing a professional guidance counselor who comes in every day and all students are encouraged to take their problems to him/her. Sometimes, teachers may recommend a particular student to consult the school counselor. Thus, recently, the school guidance programme has become an integral part of any planned education activity. Before professional counsellors came into the picture, teachers used to fill the role of providing awareness and encouragement to their students to help them overcome problems faced during learning and adjustment. The guidance was informal and case-specific, and was similar to 'suggesting' and sometimes 'ordering and prescribing'. This is similar to the ancient times when it used to be the responsibility of teachers to provide guidance to their students. It was normal for the students to be open with the teacher.

Slowly, it was realized that guidance should only be provided as personalized assistance by a trained professional who is qualified in this capacity. Guidance and counselling came to be respected as a separate field, with adequately sophisticated methodology and theories based on actual research. The field has gradually become distinct from teaching-learning and education in general.

Now, guidance counselling follows certain set methodology that includes important techniques like observation, testing, interviewing, keeping records, studying case studies and making assessments. Now guidance counselling is focused on the discovery of talents with regard to the available opportunities.

In this sense guidance is a continuous process of helping every individual through his own efforts and interest to discover, release and develop his potential for his own individual prosperity within the society. The purpose of guidance is more than finding jobs for the youth. Although at the outset of the guidance profession, the vocational aspect was given main importance, the science of guidance counselling has now gone far beyond this. It is now concerned with the growth of a person in entirety. Meaning of guidance

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The term 'guidance can be defined in two ways:

- **General meaning of guidance:** In general, guidance is the act of showing the possible paths in learning. It is process by which the individuals are assisted in making adequate adjustments to life's situations with regard to their educational, vocational and personal problems. It is an organized service which aims at helping the individuals understand themselves which means enabling them to know their abilities, aptitudes, interests, perceptions, needs, purposes and their assets and limitations.
- **Specific meaning of guidance:** The term 'guidance' has been defined in a specific manner in the words of Jones, 'Guidance is the personal help that is given by one person to another for developing life goals, in making adjustments and in solving problems that confront him in the attainment of goals'. In this manner, guidance can be classified as a kind of personal assistance.

This authoritative definition brings out clearly the salient feature of guidance. It points out that guidance is neither dictation nor directions. It is actually friendly advice and personal help offered by a competent individual, known as the guide or guidance expert, to one who is in need of such assistance. The guidance enables the person to understand his problems and to overcome them. Lack of guidance is liable to lead an individual to inadequate thought and behaviour, wrong decisions and to maladjustment.

6.2.1 Definitions

The term guidance has been defined by several psychologists. Some important definitions have been provided below:

- **According to Ruth Strong:** Guidance is a process of helping every individual through his own efforts, to discover and develop his potentialities for his personal happiness and special usefulness.
- **According to Brewer:** Guidance is a process though which an individual is able to solve his problems and pursue a path suited to his abilities and aspirations.
- **According to Wordsworth:** Guidance helps an individual to develop his personality fully and enables him to serve the society to the best of his capabilities and talents.
- **According to Carter V.:** Guidance is a process of dynamic interpersonal relationship designed to influence the attitudes and subsequent behavior of a person.
- **According to Crow & Crow :** Guidance is the assistance made available by properly qualified and adequately trained men or women to an individual of any age to help him manage his own life activities, develop his own points of view, make his own decisions and carry his own burdens.
- **According Dr. K. G. Rama Rao:** Guidance is essentially an educative process; the outcomes of which are mental and educational preparedness for some of action centered round the basic functions of men, especially those pertaining to vocational, recreational and community service fields.
- **According to C. S. Office of Education:** The process of acquainting the individual with the various ways including special training in which he may

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discover his natural endowment so that he makes a living to his own best advantage and that to society.

- **According to Secondary Educational Commission 1952-1953:** Guidance involves the difficult art of helping boys and girls to plan their own future wisely in the full light of the factors that can be mastered themselves and about the world in which they are to live and work.
- **According to the Education Commission (1964-66):** One of the main functions of guidance at the secondary level is to aid the identification and the development of abilities and interests of adolescents.

The above definitions lay emphasis on the following facts:

- Guidance is personal assistance whether given individually or in a group and it aims to render personal help or assistance.
- To render guidance is not everybody's job. It is the work of most competent and able persons, such as career masters, psychologists and counselors etc.
- Guidance can be rendered to any person of any age who is in need of it. In this way its scope is very wide. It covers different individuals of varying ages, tastes and temperaments.
- Guidance aims at developing in an individual the capacity for self direction. It helps him to become independent and self-reliant for solving his own problems and carrying his own burdens. It should not therefore, be understood as synonymous to direction. So, it is important to note that the person who gives guidance does not make an individual dependent on him or does not impose his will. The person who is guided is free to accept or reject the advice given to him/her.
- Guidance is a process that helps people to adjust to themselves and to others and to their own peculiar environment. First of all it renders help to people in understanding themselves. Then it helps them in acquaintance with the things and world around. Then finally it helps a person to seek harmony between personal needs and ambitions keeping individual peculiarities of their environment.
- Guidance aims to prepare individuals for their future. It helps them to acquire essential abilities and capacities for the tasks to be accomplished in future. It also helps the individuals in the selection of the correct future profession and role in the society and enables them to play their role effectively.

6.2.2 Nature

After going through the various definitions and their analysis, let us focus on the nature of guidance.

- **Guidance with regard to individual:** Guidance cannot be considered independent of an individual. The main objective of this exercise is to help in the growth of an individual while also considering the societal boundaries and requirements.
- **Guidance is a continuous process:** This means that the process of guidance and its implementation by the individual is not one-time. It is a dynamic exercise.

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Herein, an individual gains insight into himself or herself and becomes aware of how they can best utilize their abilities, interests and strengths. With continued guidance, an individual continues to learn how to adjust to newer situations and take the best-possible decisions in various circumstances.

- **Guidance directly related to day-to-day life:** The guidance process is related to an individual's day-to-day life. Guidance contributes in both formal and informal ways because in life, one encounters both formal and informal circumstances. While informally, guidance is taken from parents, friends etc., formal guidance is taken from the school counselor or a professional therapist.
- **Guidance promotes capacity development:** The aim of guidance is not to spoon feed the individual with the right answers, but rather to allow the individual to develop in such a way that they can realize their potential in the best possible way. From this potential then emerge other skills and a more positive self-image.
- **Guidance is individual assistance:** Guidance is mostly given to individuals and not groups, and is customized as per the needs of that individual.
- **Task of trained persons:** Not just anybody can provide formal guidance. Only trained psychologists, counselor and therapists who are qualified to do so should provide guidance. This is so because providing guidance is a complicated, tricky and multifaceted job.
- **Wide scope of guidance:** An individual of any age, background and personality may require guidance at any time and regarding any problem. Therefore the scope of guidance is required to be wide and cannot be bound within limits.
- **Helpful in adjustment:** Usually, an individual seeks guidance when they are facing a particular problem. Guidance helps them to adjust to the problem state and also find solutions. Positive guidance can energize a person and give them fresh hope to deal with problematic circumstances.
- **Helpful in developing the ability of self-guidance:** After talking to a professional for a length of time, the person may gain enough insight to be able to self-guide during future difficulties, without anyone's help. Also, the hope and energy provided by guidance may transform a troubled individual into a confident and dynamic human being.
- **No imposition of one's viewpoint:** The guidance counselor must at all times, refrain from imposing his or her own opinions and viewpoint on the person seeking guidance. The counselor can only suggest or lead the person to exploring possible options, but the final decision should be taken independently by the person seeking counseling. If the individual wishes, he or she may reject the recommendations of the guidance worker.
- **Helpful in preparing for future:** Guidance helps prepare a person for his future, so that he/she may arm himself for herself against future problems, besides dealing with the current issues.

6.2.3 Objectives

Guidance process is purposeful process. Without determining the objectives, this process cannot be conducted. Due to the variations in the scope, guidance has a variety

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of objective changes at each and every stage and level of education. The objectives of guidance can be classified into two types:

1. Objectives of guidance at primary stage

The person providing guidance at the primary stage aims at making the child independent. Also, a guide organizes his activities in such a way so as to create a feeling of co-operation among children.

1. To coordinate the functions of all those providing guidance, such as the teacher, school staff members of medical service and social service workers and the activities of the person providing guidance.
2. To assist children in developing physical and emotional stability.
3. To help develop better attitude to school activities, education and school regulations.
4. To identify problems regarding adjustment in the school and to control them.
5. To develop the ability to make decisions wisely and solve problems independently.

2. Objectives of guidance at secondary stage

At the secondary stage the scope of guidance becomes more comprehensive as compared to the scope of guidance at primary stage. Secondary stage guidance becomes more important due to multiple reasons, because at this stage each teacher addresses only one particular subject and therefore children do not spend much time with any individual teacher, unlike primary school where one teacher covers all subjects. So, the personal, social and vocational problems of the children are not very obvious and solution of these problems becomes all the more necessary:

The objectives of secondary stage are as follows:

1. To assist children in coping with extra load of studies
2. To help children in selecting the right subjects
3. To fulfill the needs related to students health
4. To provide information regarding co-curricular activities in the school
5. To create the feeling of cooperation in the children.

The main objective is creating an environment in accordance with the adolescent stage and motivating in order to acquire higher education.

3. Objectives of guidance at college and university stage

At this stage students are also very serious about their studies because they know the meaning of success and failure. However, sometimes they may not be able to deal with the transition from school to college. In such situations, the objective of college guidance programme is that the needs of such students should be looked into immediately. In college, the objective of guidance services should also be helpful to the pupils in selecting the subject so that they can acquire specialization because such specializations help the pupils in their future vocational plans.

The guidance objectives at college and university stage can also be summarized in the following manner:

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1. To make available information regarding admissions to college and university
2. To help pupils selecting subjects so that they may achieve their future goals
3. To provide information regarding co-curricular activities in the college
4. To make aware the pupils regarding the existing hostel facilities so that the problems of their boarding and lodging can be removed
5. To provide vocational information to the pupils so that they may take decision regarding their career
6. To arrange for evaluating the pupils
7. To help the children deal with their financial difficulties

6.2.4 Principles of Guidance

Principles of guidance can be defined as a set of guidelines for conducting a guidance process. Principles explain how something should be done. In order to run a guidance programme successfully, it is essential to understand the principles, along with the meaning of guidance upon which the guidance process is based. After understanding these principles, it becomes much simpler and more convenient to run this programme.

According to Jones, the principles of guidance are as follows:

- Principle of individual differences
- Principle of specific abilities that are not innate
- Principle of need of assistance in solving the problem of the individuals
- Principle of developing self-guidance
- Principles of important role of school in providing guidance

Principles according to Crow and Crow

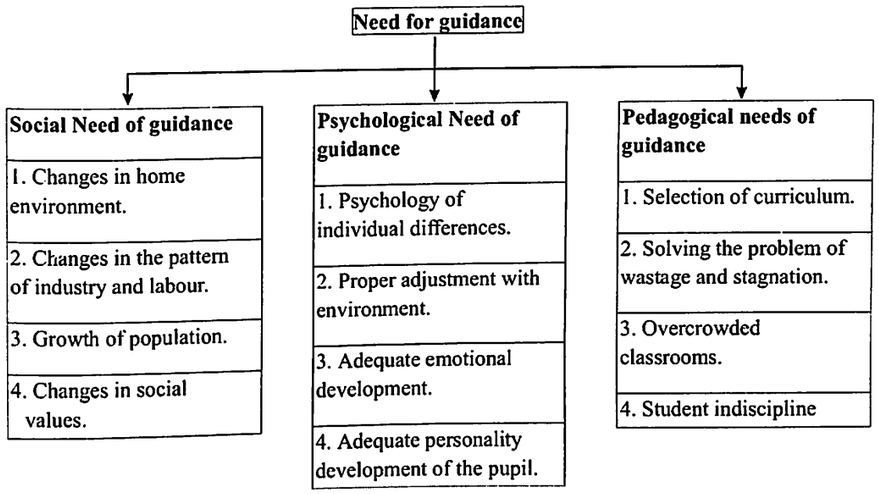
Authors D. Crow and Alice Crow have laid down the following principles of guidance:

- **All round development of the individual**: The basic principle of guidance is primarily concerned with the all round development of individual i.e. physical, mental, social, emotional and psychological. This guidance should be conceptualized as the school's provision for enabling students to create meanings in their lives. The individuals should be given complete freedom to shape their personality and guidance should be provided whenever the individual needs it.
- **Evaluation of guidance programme**: To provide guidance service intelligently, a programme of individual guidance should be planned. The guidance programme should be evaluated in terms of its effectiveness and improvement. Evaluation is essential in a never ending cycle of formulating goals, meaningful progress towards them and determining the goals which emerge as result of new conditions.
- **Principles of individual differences:** Individuals differ to a great extent in their physical, mental, social and emotional development. No two individual are alike and guidance recognizes these differences amongst individuals and works towards their development by understanding the unique characteristics, needs and problems of individuals.

- **Responsibility of skilled workers:** Parents and teachers have great responsibility in the execution of the work of guidance. The responsibility for the administration of guidance programme should be given to a qualified and adequately trained head of guidance centre, working co-operatively with his assistants and other guidance agencies.
- **Principle of expert opinion:** Specific and serious guidance problems should be referred to persons who are trained to deal with particular area of adjustment for their expert opinion.
- **Principle of continuity**: Continuity is the main factors for guidance so it should be regarded as a continuous process of service to an individual at different stages of his life.
- **Principle of extension**: Guidance service should not be limited to only the maladjusted individuals but it should be provided to all types of children. It will be of great use to develop normal and superior children for making an attempt to stimulate their intellectual growth.
- **Principle of flexible programme of guidance:** Guidance services are becoming more and more important as the variations among the needs of an individual and society are increasing. Hence, keeping in view these variations, the guidance programme should be very flexible so that necessary change can be brought about.
- **Principle of connection with every aspect of life:** The life of a social being has various aspects, therefore, the guidance programme should be relevant to all these aspects of life. The various aspects of life include an individual's physical and mental hygiene, his family, school, social needs and vocational needs etc.
- **Principle of elaboration:** The basic principle of guidance is primarily concerned with the all round development of individual. Curriculum materials and teaching procedures should be elaborated according to the viewpoint of guidance.
- **Principle of development of self guidance ability**: In the guidance process, an individual is to be made capable of solving his own problems himself. Through such guidance, ability to understand different situations can be developed and he can differentiate between right and wrong and his own limits on the basis of his judgement.

6.2.5 Need for Guidance

The need for guidance from various perspectives is there in each area of life and each area needs varying degrees of guidance at different points of time for various individuals. Without guidance, a particular aspect of life may remain untouched by progress.



With the development of science and technology, agriculture and industry in India have developed at a great speed. This situation has created many social and political problems like population explosion, increase in the number of school going children, problem of educated unemployed and underemployment which spark the need for guidance. The need for guidance may be discussed under the following heads.

(i) From the sociological point of view

A group of individuals living together is called a society. Society can progress only when the individuals living in the society are able to constantly uplift themselves. For example, in India today, the joint family system is breaking up and nuclear families are the order of the day. The main reason for this is that since the people of India are in constant contact with people from different countries of the world, multiculturalism has taken over the modern Indian society, wherein independence, self-sufficiency and personal space are important concepts. In such a changing situation, the family support of the old days is absent and individuals are highly stressed as a result of their corporate jobs and thirst for money. In such a situation, people frequently break down emotionally and need professional guidance and counselling.

- **Changes in home environment:** In ancient times, industry in India was largely domestic in nature. Children then were learning different arts and crafts in their young age and parents, especially mothers, acted as their trainers and teachers. But owing to social change, the responsibility of teaching and training has been shifted to the educational institutions. Educational institutions face the problem of identifying individual capabilities of children for undertaking different activities on the basis of their capacity. Therefore, there is a need for proper guidance.
- **Changes in the pattern of Industry and labour:** In the past, labour and industry were hereditary by nature. Children were engaged in different industrial work on the basis of their family tradition. But in modern society, thing are put in the reverse gear. There is a demand of specialization in several occupations. Therefore, people are to master different subjects to progress in life. In this state of affairs, there is a need for ability grouping. For this purpose, guidance is needed.

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- **Huge growth in population:** India had the total population of 548 million as per the census of 1971. The average density of population was 178 per sq. km. The total land area is about 3.29 million sq. kms. The latest estimated population is over 640 million. The total area of land is 2.31 per cent of the total world area, in which India has to sustain nearly 15 per cent of the world population. At present the total world population is estimated to be 3,500 million.
- The percentage of young population of in the age-group of 0-14 is very high. It was a much as 42 per cent of the total population of India in 1971. The aggregate number of eligible couples in the reproductive age group is about 108 million. The above statistical data shows that the dimension of the population problem in India is very great and severe. Therefore such increase in population and change in the desires and aspirations of people have led to the need for guidance.
- **Change in social values:** Social change in India is making the people of this country more and more materialistic and the old values and traditions are being gradually forgotten. Today there is undue emphasis on knowledge-oriented education which pays attention to the intellectual development of the pupils. This makes the educational process one sided and results in the development of lopsided personalities. The moral, religious and spiritual values of the great Indian tradition are being pushed back into oblivion. Consequently, in the modern man there is no harmony between the outer life of action and the inner life of emotions. We also find that there is a crisis of character owing to deterioration in values in social, economic, cultural, moral and religious spheres of a person.

(ii) From the psychological point of view

Curiosity in man had led him to explore his surroundings, which mainly included nature and fellow human beings. There is always a desire to know what something is, what is the background, what is it made of, what are the associated factors and in what way can it be useful to oneself? Each question will lead to more questions, and human psychology drives man to answer all the questions that emerge. Why do we feel lonely? Why do we forget? How do people learn? What makes someone creative? Why do we become angry? What happens when we take drugs? What makes someone help other? and so on. If the younger generation of the society achieve adjustment at home, at school, and in society, they are more likely to adjust well on the job too. Therefore, from the formative years, in the development of habits, trustworthiness, responsibility and social usefulness, they should begin their careers with proper behaviour patterns which will be powerful aids to success. Proper behavior adjustment is possible, when the needs of the individual are satisfied. Psychology is a subject which can help in the adjustment of behaviour in the following way:

- **Psychology of individual differences:** It is a common mistake made by almost all parents and teachers—they think of children of the same age as being alike, and consequently, expect similar behaviour from them. They also expect what 'works' with one child to automatically 'work' with another child. But it should be remembered that though the pattern of development is similar for all children, the way and rate of development differs. Some children develop in a smooth, gradual, step-by step fashion, while others move in spurts, some show small spurts, while other show wide ones. All children do not, therefore, reach the same point of development at the same age. In other words, all children of the same age cannot be expected to behave in the same way. A child from a socially backward environment cannot display the same ability in reading and writing as a child coming from an educationally conscious environment. Another example is that a child reared through authoritarian control shows differences in his sociability from a child reared up in a democratic set-up.
- Thus individuals differ in many different ways. Every individual is born with some degree of physiological and biological similarity. The process of development from birth to death is more or less alike in all individuals. Some common qualities are found in almost all persons. Every person is endowed with a head, two arms, a nose, two ears etc. to make survival possible on this planet. All have intelligence up to a certain minimum limit and emotional, physical and mental process occurs in all in the same way. In this way individuals display a great deal of similarity as human beings. In spite of these it is a proved phenomenon that no two persons are alike, even if they are born to the same parents, or even if they are twins. Therefore we will see that like so many similarities, there is also much dissimilarity among individuals. An individual has his own style of living, his own personality and his own way of understanding the world. One thing must be clear that the differences found in men are quantitative, not qualitative. This means physical, cognitive, moral and social traits are found in different quantities in different persons. Hence, individual difference is of degree not of kind. This fact can be made clear amply with the help of guidance. People are born with different abilities and potentials. To develop these potentialities in a socially desirable manner, guidance is necessary.
- **Proper adjustment:** For the progress of the individual and the society, social, educational and occupational adjustment is necessary. It is the first and foremost duty of education to provide the child with the knowledge of his personal, social and financial problems and train him on solving them. Most of the activities of an individual are with the aim of adjustment to his vocational, social and financial problems. To adjust with different situations is the very nature of man. As man wants to lead a problem-free, satisfied and happy life; he tries to adjust with his environment all the time.
- An individual can be a well adjusted person only when he gets a job or joins a course of studies or a social group on the basis of his abilities, talents, motives, attitudes and capabilities. Guidance and counselling play an important role here by helping them in adjusting better.
- **Emotional problems:** The magic word that makes human life dynamic and makes him multifaceted within the society is 'emotion'. Emotions can be compared to a battery charged by nature in an organism that provides him with primeval forces of great power to adjust and cope with the environment. Emotions add colour, spice, lyric and adventure to our lives. Along with this, they connect the mental and physical activities of man. Between the hide and seek game of happiness and sorrow, human life becomes a daring adventure. Emotions control most of our activities. The best achievements as well as the worst deeds of human beings are the product of different emotions at different times. History is sufficient proof that starting from the war of Mahabharata and up to the wars of today, the root cause of all the destruction is nothing but

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human emotions, while some emotions make our life awful, others make it happy. Hence, all the individuals living in the society have to take the help of guidance in some form or another. As a result of which they can experience proper emotional adjustment.

- **Personality development:** It is perhaps the most complex and mysterious than any other topic in psychology. Psychologists, even after putting in their best efforts to decode the human personality have not seen much success in clarifying the intricacies of personality. It is true that scientists and explorers have become successful in unveiling the mysteries of nature and going successfully into outer space, they have however, failed miserably in giving a true and universally acceptable explanation of their own personality.

Human personality expresses itself in such divergent ways that its analysis and findings differ from time to time, place to place and person to person. It is like a bunch of tangled thread, of which if one end is pulled out, the whole bunch turns to a knot. The more we study it, the deeper becomes its complexity.

Some psychologists define personality in terms of social stimulus value, by which an individual can influence other persons he meets on his way. Using this definition we can evaluate a person, from his appearance and mode of talking. We can gather an idea of whether he is impressive or repulsive, dominating or submissive, and so on, from the impression he leaves on us by his physical appearance, clothing, conversation and etiquette. So while selecting candidates for various jobs and courses, the interviewers stick to this definition of personality.

The second group professing a summative approach defines personality as the sum total of different process and activities of the individuals, for example, habits, impulses, emotions and innate dispositions.

The third group advocates an integrative approach and defines personality as the integrative organization of all cognitive, affective, conative and physical characteristics of an individual as they manifest themselves in focal distinction from others. In this regard, Mark Sherman, in his book, *Personality Inquiry and Application* has defined personality as 'the characteristics pattern of behaviours, cognition and emotions which may be experienced by the individual and/or manifest to others.'

Some psychologists profess that personality is the sum total of inherited and acquired traits, desires, inspirations and nature.

Human beings always adjust themselves to their environment. Every individual has his own way of adjustment. This factor is championed by G.W. Allport who defined personality as 'the dynamic organization within the individual of those psychophysical systems which determine his unique adjustment to his environment.'

J.B. Watson, the eminent behaviourist, developed a definition that reads 'our personality is the result of what we have lived though. It is the 'reaction maus' as a whole.'

In this way we see that the definition and views advocated by various psychologists are blended and varying. The root cause of this may be that personality differs from individual to individual to a high degree. Personality develops in different ways in different environments. Apart from this man gains knowledge from his experience. And experience and present environment are two factors in one's life

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between which the individual has to make adjustments. For such adjustment, man needs guidance. Thus, this subject can help them in suitably adjustment to their environment, and this, in turn, will lead to the development of personality traits.

(iii) From pedagogical point of view

The term pedagogy means the study of methods and styles of teaching, and pedagogy is concerned with the application of the teaching methods and skills in the teaching-learning situation. It is nothing but philosophy of teaching in action. Philosophy of teaching provides knowledge about ways, means and techniques of teaching and pedagogies make it practical and fundamental to recognize that each student beings his/her own unique frame of reference to the classroom. The pedagogue or the teacher, through pedagogical actions, creates opportunities for the students to organize what he/she is learning. In this situation the teacher takes the help of guidance. From pedagogical points of view, the need of guidance is felt on the following points:

- **Selection of curriculum:** Education is concerned with three important factors—the 'Why' 'How and 'What'. The term 'why' is concerned with the objectives of education. Education should be imparted in such a manner that these objectives can be realized. So, this factor refers to the goal of education. The second factor refers to the methods of teaching, and is concerned with how the instruction is being given, what methods of teaching are being used, and so on. The third factor refers to the curriculum. Curriculum is considered as the heart of the educational enterprise. Within the twentieth century, the curriculum of schools and of colleges has been defined in several ways—some people have called the curriculum the accumulated tradition of organized knowledge contained in school and college subjects. Other persons have considered it to be the modes of thinking and inquiring about the phenomena of our world. Still others have called the curriculum the experiences of the race.

  To fulfill the objectives of education, curriculum plays an important role. It works as a means for the development of attitudes, formation of habits, developing proper knowledge and skills in different areas and application of skills and abilities in different situations. Students in modern location study science, arts, commerce, agriculture, home science, different types of technical and vocational courses and fine arts. This led to the problem of selection of courses. For the selection of different courses a student has to take the help of guidance.

- **Problem of wastage and stagnation:** Allied problems which obstruct the efforts to universalize education in India are the double arrows of wastage and stagnation. In the past, the term 'wastage' was used to denote all kinds of waste in the field of education. But now it is used in a restricted and technical sense. At present it denotes the cases where a child drops out of school without acquiring a stable literacy level which is the goal of primary education or elementary education. For example, a child who has passed the third class of a elementary school and spent about a year in the forth class generally acquires a stable literacy. Consequently, every child who leaves school before completing this course is held to be case of 'wastage' because he is not likely to receive any lasting benefit from such schooling. Wastage is defined by the Auxiliary Committee popularly known as the Hartog Committee as 'the premature

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withdrawal of children from schools at any stage before the completion of the elementary course.'

The second important evil of the present system of primary education is 'stagnation'. The students at every stage of education are expected to pass examinations. But it has been found in general practice that many students are not able to pass the examinations in one class or in more than one class within the prescribed period. Thus they stagnate in the same class. This phenomenon is technically known as stagnation. Johri and Pathak viewed the term as follows, 'The most popular use of the word 'stagnation in education means the detention of a student in class for more than one year on account of his unsatisfactory progress.'

These two problems arise for want of proper guidance to the parents and the students. Therefore, to overcome these problems there is a need for guidance.

- **Overcrowded classrooms:** Indian Government has made provision for free and compulsory education at the primary stage. Therefore, a large number of students from different socio-economic backgrounds, having great individual differences are flocking to schools. Thus, classrooms are becoming overcrowded. This situation becomes a challenge for the teaching community since putting together the gifted, the slow-learners, the socially backward and the handicapped children creates a lot of problems for the teachers. To overcome this problem, the teacher has to take the help of guidance.
- **Student indiscipline:** The word 'discipline' can have a varied meaning. It may be viewed from two perspectives: (a) narrow and (b) wide. In olden times, discipline in education meant subjection to authority, obedience to law framed by others and keeping students under strict control. From a broader or modern point of view, it means the training of mind, manners and attitude, development of instincts, formation of right habits and the development of character.
- For the point of view of an individual, 'discipline' means to bring under control his instinctive urges. For the whole society it is a source of developing a social sense in an individual, so that he identifies himself with the society and tries for the betterment of the same.

Formerly discipline was forced by means of corporal punishment. That type of discipline was the external one. It was believed that an individual himself is not interested in keeping a check on his behaviour. He is merely a beast who always thinks of his own pleasures and requirements. So, it is natural that his interest will come in conflict with the interests of the society at large. Discipline was the means of checking him from harming the society.

Check Your Progress

1. Who provides guidance?
2. Give an example of unorganized guidance.
3. State any one objective of guidance.
4. What are the five principles of guidance?
5. What is the psychological need for guidance?

6.3 TYPES OF GUIDANCE

There are as many types of guidance as there are problems confronting any youth. No list can be complete and there is always overlapping between the various types so much so that in practice, it is not always possible to separate one from the other. The Central Bureau of Educational and Vocational Guidance in Delhi have suggested three kinds of guidance. These are—personal guidance, vocational guidance and educational guidance.

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6.3.1 Personal Guidance

Personal guidance deals with the issue of personal adjustment in different spheres of life, such as health, social, psychological, civic sense, etc. These problems can be found with the youth, who undergo the process of growth, but are mostly more acute for the adolescents who generally get worried about their development process i.e. physical mental, emotional, social and development sexual roles. It has been rightly said by Dr. S.S. Chauhan that adolescence is a period where an individual searches for economic, social and emotional independence. It is the time for the individual to utilize at a more natural and complex level, the ability to give, as well as to communicate with others and to trust them and to learn from them what is harmful and what is good for themselves and others.

Meaning and concept of personal guidance

The term 'personal guidance' refers to the help given in the development of the individual as a person, not merely as worker or a student but as a growing or developing personality that works in an integrated pattern of life. It is based on the democratic concept of the worth of the individual.

Following are a few well-known definitions of personal guidance:

1. **According to Hopkins:** Personal guidance is that guidance which is concerned with the problems of health emotional adjustment and social adjustment of as individual. It also includes his recreational and time problems.
2. **According to Wilson:** The purpose of personal guidance is to help the individual in his physical, emotional, social, moral and spiritual developments and adjustment.
3. **According to Ruth Strong:** Personal guidance is the assistance given to an individual to solve his personal problems, such as emotional and social adjustment, economic and social relationship and problems connected with his Physical as well as mental health.

An analysis of the definitions given by various experts reveals that personal guidance is concerned with all kinds of personal adjustment problems of an individual and giving assistance to solve those problems.

Need for personal guidance

1. To help the individual in solving all problems of their life
2. To help an individual in increasing his/her ability to discover the difference between situations where it is wise to surrender and avert a misfortune or to keep on with persistence to achieve a goal

Objectives or function of personal guidance

The following are some of the important objectives of personal guidance:

- To assist the students to realize that it is natural to experience periods of turmoil
- To assist students to enter into the mental activity with renewed interest and vigour as they approach maturity
- To help students to overcome the awkward years of physical development
- To encourage students to continue the health, safety and physical education activities

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- To help students to move gradually from dependence on others to independence of judgment and action
- To help students to work to the limit of their capacity with full knowledge that they may not be as capable as other students
- To help students to develop control over their emotions

Scope of personal problems

Following are some of the individual problems needing personal guidance:

- Problems related to health and physical development
- Problems related to emotional behaviour
- Problems related to home and family relationships
- Problems related to sex, courtship and marriage
- Problems related to religion, morals, ideals and values
- Economic problems
- Problems related to social relationships

Many problems faced by school students are of personal and social nature. These problems are related to an individual's sense of self. Problems of educational and vocational guidance are concerned with things which occur in the environment outside of an individual. Personal problems are concerned with something which occurs within the individual. These are personality related and behaviour related problems. Factors for these problems may be environmental and external factor, but the phenomena of problems are internal appearing in the form of feelings, emotions, and attitudes expressed quite often in the forms of behaviour such as aggression, sulking and unwillingness to participate in activities. Everyone in the school contributes to the development of the students by fulfilling special guidance responsibilities. In most of the schools, the class teacher plays an important role in school guidance services, therefore, the cooperation between the Headmaster, the classroom teacher, the parents, the community and the school administration is essential.

Principles of solving personal problems through guidance

Following are the basic principles for solving personal problems:

- Human personality is complex. It is unit of body and mind
- All problems are inter-related to other problems
- Each of the personal problems is always based on some cause
- Every personal problem is connected with the intensity of emotions
- Fundamental problem lies with an individual's understanding of self concept
- Individual's insight becomes helpful in solving problems

Steps of personal guidance

1. **Collection of all information about the individual:** The essential information or data concerning the individual, who needs personal or psychological guidance, should be collected. It may be concerned with his physical, intellectual, social and emotional development, academic or scholarly achievement, personality

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characteristics, interests and aptitudes, family and school background and other environmental conditions.

2. **Diagnosis of the causes of the problem:** After collecting the data the problem of the individual is analysed in relation with the collected information. The problems underlying the individual are detected. For having a correct diagnosis, a personal interview or other techniques may also be adopted and more information is gathered.
3. **Chalk out the remedial measures:** In view of the detected possible causes, the remedial measures are chalked out. The guidance worker now thinks about the personal guidance that may be provided for the individual for getting rid of his problems.
4. **Rendering personal guidance:** By first establishing proper rapport, the guidance counsellor makes the individual realize the main cause of his difficulty. Sometimes on this basis, he is made to realize or even think about the possible change in his behaviour or attitude. For this purpose so many valuable techniques like suggestion, imitation sympathetic, affectionate advice, sublimation or catharses can be used. Psychoanalysis or other psychological theory can be adopted because the sole purpose of such guidance is to help or assist the individual in getting rid of his difficulty either by modifying his behaviour or bringing some changes in his environment.
5. **Follow-up service:** After rendering personal guidance to an individual it is essential to evaluate the progress of such guidance through personal guidance contact or any other suitable technique. It is such follow up programmes that help in identifying the strength and weakness of the administered personal guidance. It may also suggest the need of further guidance to him.

6.3.2 Vocational Guidance

Vocational guidance is guidance given to a person chiefly on vocational problems. It had its beginning in Parsons' vocational study which was completed by him in 1908 at Boston in America. He was the one who used the term 'guidance' for the first time.

The term was originally used for the activity of helping the youth select their vocations and guidance was only considered occupational advice. However in the 1930s and 1940s, state governments in America started to recognize guidance as a profession and implemented various programmes related to guidance. After the Second World War, guidance services gained popularity in America rapidly and U.S. office of Education and U.S. Employment Service played a major role in increasing their popularity.

Historical development of vocational guidance in India

In India, guidance movement started as an academic discipline and according to Pasricha, the first Indian university which included guidance in its course was Calcutta University, in its department of Applied Psychology in 1938. In fact, the discipline of vocational guidance also finds its roots in the same course because it included an analysis of some key occupations. The course also included classification of major occupations into four categories, on the basis of level of intelligence and the abilities needed to complete these jobs.

In 1941, a retired accountant, Batliboi, set up the Batliboi Vocational Guidance Bureau in Bombay, with the purpose of providing vocational guidance to individuals. It was a unique concept in India at the time. Just four years later, in 1945, Patna University launched the Department of Psychological Services and Research. The department aimed to support students in career decisions, as well as sorting out social and personal concerns. A similar notable landmark was the Parsi Panchayat Vocational Guidance Bureau, which was set up in Mumbai in 1947 with assistance from the Indian Institute of Education and Headmasters Association of Bombay. In 1947 itself, the Government of Uttar Pradesh established a Bureau of Psychology at Allahabad, based on the recommendations made by Acharya Narendradeo Committee Report on Education. A key aim of this report was to facilitate educational and vocational guidance for school-going children and also other troubled youth. It also had branches in various smaller regions and districts which gradually faded out. Eventually such guidance bureaus came up in West Bengal (1953), Orissa (1955), Bihar, Gujarat and Madhya Pradesh (1965).

In 1954, Central Bureau of Educational and Vocational Guidance was established by the Central Government at Delhi. In 1950, the Bureau of Vocational Guidance in Bombay had been set up, which focused on providing occupational information and vocational guidance. Different from these institutes was the U.P. Bureau of Psychology which focused on programmes of educational guidance and development of psychological tests. The name of Vocational Guidance Bureau of Bombay has now been changed to Institute of Vocational Guidance. Apart from these institutes, the National Employment Service also offers guidance to the youth who are looking for employment. The Service also collects occupational information and broadcasts it through its various units. In 1961-62, it started a programme of employment service for university students. Besides this, the Directorate of Employment and Training, a department of the Central Government has established guidance sections in many employment exchanges.

Thinkers in the field of guidance have defined vocational guidance in different ways:

1. **National Vocational Guidance Association (USA, 1937):** Vocational guidance is a process of assisting the individual to choose an occupation, prepare for it, enter into it and progress in it. It is concerned primarily with helping individuals to make decisions and choices involved in planning a future and building a career, decisions and choices necessary in affecting satisfactory vocational adjustment.
2. **General Conference of International Organization:** Vocational guidance is assistance given to an individual in solving problems relating to occupational choice and progress with due regard for individual's characteristics.
3. **Myers:** Vocational guidance is fundamentally an effort to conserve the priceless native capacities of youth and the costly training provided for youth in the schools. It seeks to conserve these honest of all human resources by aiding the individuals to invest and use them where they will bring greatest satisfaction and success to themselves and greatest benefit to the society at large.
4. **Super:** Vocational guidance is the process of helping a person to develop and accept an integrated and adequate picture of himself and of his role in the world of work, to test this concept against reality and to convert it into a reality with satisfaction to himself and benefit to society.

5. **Technician and Vocational Education (UNESCO, 1974):** This comprehensive term embraces those aspects of educational process that are involved in addition to general education the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. Such an education would be an integral part of general education and a means of preparing for an occupational field and an aspect of continuing education. Technical and vocational education should further contribute to the achievement of society's goals of greater democratization and social, cultural and economic development, while at the same time developing the potential of the individuals for active participation in the establishment and implementation of these goals. It should lead to an understanding of the scientific and technological aspects of contemporary civilization. In such a way that men comprehend their environment and are capable of acting upon it while taking a critical view of the social, political and environmental implications of scientific and technological change given the necessity for new relationship between education, working life and community as a whole, technical and vocational education should exist as a part of system of lifelong education adapted to the needs of each particular country.

All this will make it amply clear that it is impossible to separate the vocational aspect of guidance from educational and personal aspects of life.

In fact, vocational guidance is needed because of the situation which arises from the differences amongst individuals and differences amongst occupations open to them. Vocational guidance helps in reducing the number of misfits and to increase the national rate of productivity. It will also help to eliminate frustration, tension and sense of failure from the life of workers.

After reviewing and analysing the various definitions, the meaning of vocational guidance becomes more distinct in term of the following characteristics:

1. To assist the pupils in selecting those vocations that are according to their capacity, interests and abilities
2. It helps him to identify his own strengths and limitations
3. It helps him to make wise decisions regarding his occupation
4. After entering into a vocation the individual is further helped by vocational guidance in his vocational adjustment
5. It helps the individuals to acquaint them with all such opportunities. 'It aims to stop the huge wastage and misuse of the time, money and labour that may occur in the preparation or training of the pupils for a particular profession

Need for vocational guidance

1. **Individual differences:** It is needed because of the guidance situation created by two sets of differences i.e., differences among individuals and difference among courses of action open to them.
2. **Financial loss of an individual:** We notice that many of our youth obtain B.Ed. degrees and join clerical job, learn trades and join as peons and guards. This wastes both time and money of the individuals, society and the nation. Vocational guidance reduces such placements.

3. **Financial loss of the employers:** When an electrician apprentice decided to leave his job and becomes an automobile mechanic the employer is to replace him. The new worker takes time to gain proficiency to the point attained by one who had left. The quality and the quantity of work suffer. The time spent on the selection and appointment of the previous work is also wasted. The trend is more with the younger than old workers.
4. **Financial loss of the society:** D.D. Eisenhower has said, 'the wealth of the world is created by the work of skilled hands on raw materials.' Because of the loss of individual and employers due to non-availability of guidance services, the cost of finished goods goes high.
5. **Health point of view:** Wrong choice of occupations affects adversely the health and mental health of the workers. Sometimes nervous system is put under strain due to continual efforts to maintain a speed of production beyond one's capacity and other such professional stress factors.
6. **Personal and social values:** Failures in one's occupation has a greatly demoralizing effect on an individual. 'Each failure in the experience of a young worker increases the probability of another'. Myers writes, 'a frustrated worker is a curse for himself and society. It hampers his personal growth and decreases contribution to the human growth and social values'. In the words of Super, 'Occupation is not merely a means of earning a livelihood but also a way of life, a social role'.
7. **Utilization of human potentialities:** The society loses much through its failure to discover potential genius. The identification of the genius and his proper development helps in the utilization and development of human resources. It is in fact, the genius, who contributes for the utilization and development of human capital.
8. **Complex nature of society:** We require scientists, engineers, technicians, technologists and other such experts in order to organize our industrial and commercial establishments etc. Many new occupations are also coming to the forefront. Ours is an expanding economic structure and this fact intensities the need for the help of complex nature of our society.
9. **Growing diversified information concerning individuals:** The new method of studying the individuals helps us to understand them in a more scientific and comprehensive way, a factor which is of great assistance to a guidance worker in guiding an individual in the matter of making a choice of occupations.

Main objectives

1. Introducing the pupils to social importance of various vocations
2. To develop the capability and ability of analysing the information related to vocations in the pupils
3. To introduce the pupils to various vocational training centres
4. To introduce the pupils to the types of persons required for particular vocations and what type of vocation suits a particular type of personality
5. To provide facilities to observe different vocations
6. To provide various opportunities to the pupils in order to make their interests comprehensive
7. To explain to the pupils how they can render social service through vocations
8. To tell the pupils how they can acquire self satisfaction

Stage-wise objectives of vocational guidance

The objective of vocational guidance at school level of education is not to help children in choosing a vocation, but to develop favorable attitudes towards and insight into the world of work. The objectives of school level vocational guidance are as follows:

1. To provide enough opportunity to pupils for developing understanding about the world of work
2. To provide the students vocational information that meets their needs
3. To provide the occupational information that is integrated with the curriculum

Objectives of vocational guidance at college level

The process of vocational guidance at this stage has been constituted of the following activities according to Moser and Moser.

- Testing and interpreting test scores for the students.
- Encouraging students to read about and explore suggested occupations
- According personal interviews with the students and discussing with them the tentative decision made by them, the aim being to increase the level of familiarity with tentatively chosen field of occupation

There are some other aims and functions of vocational guidance which are as follows:

- To help the students to relate their studies to the vocations that are open to them at the end of the college career
- To help them to make a comprehensive study of the career which they would like to pursue
- To help the pupils to acquaint themselves with avenues for higher studies
- To help the pupils to know about the various programme for improving their prospects

Principles of vocational guidance

Given below are principles of vocational guidance:

- Client centered principles
- Personnel centered principles
- Organization centered principles
- General public centered principles

1. Client centered principles

- Making guidance service available without interruption
- Guidance covering all clients

- Making guidance programme client centered
- Guidance services meeting the varied and extensive need of the individual
- Leaving choice-making to the client

2. Personnel centered principles

- Allowing field workers to undertake follow-up studies
- Offering placement services
- Providing in-service training and maintaining professional efficiency
- Observing a strict watch on the conduct of professional ethics and collecting more information about the clients
- Using innovative methods and techniques
- Making provisions for individual and group guidance programme

3. Organization centered principles

- Seeking cooperation from similar organizations
- Providing adequate supply of materials, space and budget
- Responsiveness to guidance programmes, i.e., individual as well as group guidance
- Offering placement services, adequate staff and adequate supply of material

4. General public centered principles

- Mobilizing public opinion
- Making public receptive to guidance programme
- Making public conscious of the careers of young members of the society
- Cooperation to the guidance workers
- Identifying their needs and bringing these to the notice of the guidance personnel

Procedure

In order to understand the procedure of vocational guidance it requires two categories of information to be collected—the first concerning indispensable information about the individual and the second pertaining to knowledge of the industrial or occupational aspect.

1. **Study of individual:** For vocational guidance, some adequate information concerning their education as indicative of level of intelligence, mental abilities, aptitude, interests, physical development, health, nature, personality, characteristics and economic status must be gathered because variation in any them will necessarily require change in guidance.
2. **Study of professional world:** Having collected all the necessary and desired information about the individual under consideration, it is necessary to turn to another aspect of vocational guidance, that of studying the professional world. While the psychologist must necessarily have enough information concerning the person to whom he is imparting vocational guidance, it is equally important

that he be well informed about its professional and occupational aspects only then can he provide proper and effective assistance. It is enough for the psychologist to know the number and kinds of professions but also the kinds of education training, mental ability, interest aptitudes, personality, qualities etc.

In this manner, vocational guidance will involve the following steps:

- Orientation talk
- Psychological testing
- Collection of date from the school
- Collection of date from the family
- Interview
- Formation of profile
- Achievements

6.3.3 Educational Guidance

The various classifications of guidance have assigned an important place to educational guidance, because educational process is closely related to a person's life and guidance is an integral part of educational process.

Educational guidance is a specific area of guidance which takes care of students' problems which contributes to their educational progress and experiences. Educational guidance is a process of creating favourable conditions for the pupil's development or educational progress. From this point of view, educational guidance is required at each level during a pupil's education.

The term educational guidance consists of two words – education and guidance. Considering education as a process of development, John Dewey has also defined education as 'education is the development of all those capacities in the individual which enable him to control his environment.' 'Guidance is a continuous process of helping the individual to develop to the maximum of his capacity in the direction most beneficial to himself and to society'.

- **Meaning of educational guidance:** Educational guidance is a vital area, which has been defined by various experts of the field of guidance. The following facts regarding the nature of educational guidance have come to light after analysing some definitions.
  (a) Educational guidance is a comprehensive process.
  (b) Various types of educational problems can be discussed in educational guidance, such as how to study. Adjustment of school life with other activities, regular attendance in the school, to complete the given task, interview, conversation, sitting in examinations, use of libraries, use of common devices regarding learning, capacity of making decision in life etc.
  (c) Educational guidance is important to help students to choose appropriate courses and to make the maximum progress.
  (d) Educational guidance helps the students to develop their potentialities by providing opportunities.

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(e) Educational guidance is appositive developmental programme meant for exploring the educational needs of students.

(f) The process of educational guidance involves knowledge of students' abilities, interests, awareness of educational opportunities and counselling.

Need of educational guidance

Educational guidance is needed for the following reasons:

1. **Due to individual differences:** Guidance is needed because individuals differ in intellectual abilities, interests, motivation and also in their level of aspirations. To cater to the needs of individual students, educational guidance is needed to be imparted in schools.
2. **Due to need for selecting subjects:** In many circumstances pupils are not aware which subject they should select in order to enter some specific vocation. For solving these subject selection related problems, the educational guidance services are very significant.
3. **For adjustment of pupils in school:** The problem of adjustment is very deep. No one can make desirable progress is any field without proper adjustment. Whenever a pupil enters a new school he has to face adjustment problem, due to school language medium, (Hindi or English) school environment, and teaching methods etc. Hence, the need of educational guidance cannot be denied because it is required to know their problems, analysing them and to suggest some remedy.
4. **To check wastage and stagnation in education:** In Indian educational field, the problem of wastage and stagnation has taken a very serious turn. As a result of this problem, the pupils drop out of school without completion of a semester or they stagnate for years at one level. The reason may be any, such as illiterate parents, narrow attitude of parents, unsatisfactory economic condition of parents, shortage of sufficient schools, lack of favourable environment in school etc. The problems of wastage and stagnation are more frequent in rural areas as compared to urban areas. In the Indian constitution, there is a provision for compulsory school education for the children of 6-14 age group, but this objective could not be achieved due to one or the other reason. The pupils, their guardians, and the teachers wish to control these problems by knowing the causes of wastage and stagnation, by analysing them and by applying some remedy to solve them. In order to achieve this objective, educational guidance services can play an appreciable role.
5. **For information regarding future education:** The behaviour of students must be studied in order to progress from one level to another level. Once these behaviours are identified properly, only then the students can be guided adequately for their future education. The key area where students need guidance usually is that they are not able to decide whether they should expand their academic achievements or if they should prepare for competitive exams in order to enter a vocation or should they learn some particular skill. Sometimes students restrict their future education by making a wrong decision. This may lead to them suffering throughout life. Also, they have to face the problem of maladjustment. Hence, in order to provide knowledge regarding future education, educational guidance is needed.
6. **For guiding exceptional children:** Educational guidance is most essential for different categories of exceptional children because generally, in our schools, the teaching proceeds with the average student in mind, with the result that the gifted, the slow learner, deaf and mentally and physically handicapped are clubbed together in one class and end up not benefitting at all from classroom teaching. Guidance counselling helps to recognize the extraordinary talents of children and make their parents aware of their child's special capabilities, so that the best possible opportunities can be explored for utilizing these talents.
7. **For a change in school administration and teaching methods:** On one hand, content of education and its scope has expanded in the field of education, while on the other hand, important changes have taken place in school organization, administration and teaching methods. In educational administration, narrow-mindedness has been replaced by broad-mindedness these days. Earlier, education was merely a process of intellectual development but these days, education is considered the means of solving individual and social problems. Similarly, traditional teaching methods were not too well-developed, but today, a change has occurred in the teaching methods as well. At present, child-centered teaching methods are more popular than traditional methods— based on the principles of individual differences, school administration and teaching methods are selected. In this selection too, educational guidance is most essential.
8. **Due to the increasing percentage of delinquents:** When a person deviates from the social norms, he is termed a delinquent. This type of anti-social behavior causes friction between the individual and society. The society gives birth to these delinquents and it is the same society which is responsible for providing the opportunities to this person. Providing these opportunities is only possible when there are means of proper guidance in the educational system.

Objectives or Functions

Educational guidance has its own aims and we can classify them into two parts:

1. Main objectives of educational guidance
2. Stage-wise objectives of educational guidance

1. Main objectives

The main objectives of educational guidance in school are as follows:

- To help students understand their strengths and weaknesses in particular subjects
- To provide consideration and solution of failures at examinations
- To develop students' individual potentialities according to ability
- To enhance the accuracy of the pupil's self perception
- To identify the students who are gifted or mentally or physically deficient and make special arrangements for them for creating custom education programmes

Education Polices commission of the National Association USA has laid down the following objectives of educational guidance:

- The objective of self realization
- The objective of human relationship
- The objective of economic efficiency
- The objective of civic responsibility

2. Principles

The principles of guidance can be defined as a set of guidelines for conducting any guidance and counselling activity. They are to be followed in order to do something efficiently and effectively. They explain how something should be done. Principles of educational guidance mean those well-accepted ideas or guidelines which should be kept in mind when the guidance worker attempts to acquire and use the knowledge of its various operations involved in the application of the knowledge to a student's life.

- **Principles of using standardized tests:** On entering high school or shortly thereafter, the students should be given standardized tests that will be prognostic in nature, for one or more courses.
- **Principle of relationship with school and parents:** In educational guidance there should be a close relationship with the school and parents. In the absence of this relationship, educational guidance programme can not be termed as complete.
- **Principle of educational guidance for all students:** It is believed generally that guidance is for selected categories only but it is not right because guidance is needed at every step of education for students. This principle must be essentially considered because all pupils do not have similar abilities. Every student feels the need for educational guidance at every step so educational guidance should be made available for all.
- **Principles of proper and relevant information:** For any type of guidance, proper and relevant information is a must otherwise the guidance programme cannot help the students. Therefore, guidance should be provided on the basis of relevant information. Educational guidance is necessary to solve the problems of the students.
- **Principles of follow-up study:** The objective of educational guidance is to guide the students to select subjects according to ability and interest, so it is important to evaluate the success of educational guidance.

3. Educational guidance at various stages

There are various stages of education. At each stage students face different problems. Different methods therefore have to be applied to solve the particular problems of every stage.

- Educational guidance at primary level
- Educational guidance at secondary level
- Educational guidance at college level

Education guidance at primary school level: Primary school stage can be classified into stages.

- Guidance at kindergarten level
- Guidance at primary stage

Educational guidance at kindergarten level

At the kindergarten stage, the main aims of educational guidance are:

- To help the child adjust to the new life of the school
- To help the development of the personality of the child
- To develop social behaviour of the child
- To solve the problems concerning learning
- To help children adjust to the new environment

Educational guidance at primary level

- It helps the students to make a proper beginning
- Aiding students to plan intelligently
- Aiding students to get the best out of their education
- Preparing students to enter the secondary school
- Making categories according to the needs of the students
- Providing the opportunities to the mentally retarded and highly intelligent children according to their needs
- Helping the maladjusted and handicapped children

Educational guidance at secondary level: At the secondary stage, a well organized guidance programme is essential. Educational guidance can be provided through the following activities:

- Aid in the identification and development of the abilities and interests of adolescent students
- Help students understand their own strength and limitations
- Help them to make realistic educational choices and educational plans which should be based on consideration of all relevant factors
- Help the headmaster and teachers to understand their students as individuals and to create situations in which the students can learn more effectively

The activities at this level are as follows:

- Aiding students to orient themselves to the new purposes of education
- Aiding students to orient themselves to the needs for good planning
- Aiding students to adjust themselves to their education by making wise choices of the subject of study
- To make students aware of the nature and the objectives of higher secondary school curriculum
- To make the students aware of professional importance of various curriculum

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- To provide help to the students in assessing their abilities, aptitude, skills and interest
- Aiding students to make progress in their education by removal of subject difficulties and development of good study skills
- Aiding students to build proper motivation for study

Educational guidance at the college level: At the college stage, the personality pattern of the children gets matured and most students start realizing their responsibilities. Some are very serious towards their studies and they understand the meaning of success and failure but there are some students who enter college without any appreciation of what college education means. They enter college only because that they are not aware of all the options available. As a result, they have to face many difficulties. At the time of admission to the college, if educational guidance is provided to the students, many of them can be diverted towards more useful courses and career paths.

4. Techniques for imparting educational guidance

We can divide the process of educational guidance into two parts:

- Techniques for individual guidance
- Techniques for group guidance

Techniques for individual guidance: In this method guidance is given by meeting the students personally for solving their problem. For this, the following procedure is followed:

Initial interview: In this initial interview, all the relevant information should be collected by the education guidance worker. Information is usually about family circumstances, educational and vocational plans and leisure time activities of the student. Initial interviews aim to establish rapport between the pupil and the person who will be giving guidance.

Cumulative record of the students: Important information records related to the students are called cumulative records. This cumulative record includes the following information: intelligence quotient, interests, aptitude, information related to health and physical development, special mental abilities, educational achievements, family background and economic conditions, basic information about the parents of the friends of the students and information about neighbours. All this covers the various aspects of the student's personality.

These above mentioned information can be collected with the help of questionnaires and socio-economic status scale.

- **Psychological testing:** For educational guidance, it is necessary to study Psychological aspects of the pupils. These can be studied by psychological tests. These test are – Intelligence test, aptitude test, interest inventories, achievement test, personality test etc. These tests can be administered individually in group.
- **Collecting information regarding schools or colleges:** After collecting information regarding the various aspect of the pupil's life, it is essential to collect information regarding the school and colleges. This information includes

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available subjects, curricula and other facilities provided in schools and colleges. Using this information, a pupil can select a subject and school according to their capacities and abilities.

6.3.4 Group Guidance

Group guidance refers to all types of activities carried out with a groups of people seeking specific guidance. This may include orientation, occupational information courses and even seminars and lectures. Group guidance methods are as follows:

Orientation talk: In order to provide guidance to the students in groups, the counsellor explains the importance of educational guidance and encourages them to think about various educational problems in depth.

Psychological testing: After orientation talk, students are made to take psychological tests in order to assess their personality types, aptitudes, interests and bent of mind.

Collecting information from school regarding students: In educational guidance, it is a must to collect information about students because without full information, good guidance cannot be provided. Cumulative records, maintained in the school, are one of the most helpful sources for this activity. Besides this, interviewing teachers about a student's interests, habits, personality traits and co-curricular activities can be useful.

Collecting information from family: The family is a child's first friend, school and society. Parents know the most about their children, naturally, and know the most about habits, interest, aptitudes, personality and future educational and vocational plans. All this information can be collected by correspondence, or meeting the parents personally.

Interview with the students: By interviewing students, interests towards various subjects and vocational plans etc. can be known. At the time of interview, a self-inventory would be helpful.

Construction of profile: While taking the interview and collecting information, a profile of the student should be made so that any information about pupils can be easily viewed at any time. In short, a profile is like a snapshot of a pupil's life.

Conference: After taking information from profile, a conclusion is placed before 'educational guidance workers' group'. All the experts take interest and jointly make a decision about the pupils. This stage is very important because this decision would affect the future of the students.

Report writing: Educational guidance workers' group should make a report on the decision taken during the conference. The report should also be submitted to the parent, teacher and school authorities. Students should act upon on this report.

Follow-up activities: Follow-up activities are very essential to gauge the effectiveness of guidance. It is also important to assess the extent to which the students have gotten their queries and concerns resolved. If the guidance worker sees unsatisfactory results, which means that little or no improvement is seen, he/she will again analyse the information related to the pupil and make certain changes accordingly in his report and guidance to the student.

Check Your Progress

6. Name the three kinds of guidance.
7. Define vocational guidance.
8. State one of the needs for educational guidance.
9. Why is the profile of student created?

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6.4 MEANING OF COUNSELLING

Counselling involves discussions and interactions between a person who has a problem that needs to be solved, and a person who helps him identify ways in which to solve the problem. This section deals with various fundamental features of counselling, such as its meaning functions, goals and importance.

Good (1945) defines counselling as an 'individualized and personalized assistance with personal, educational, vocational problems, in which all pertinent facts are studied and analysed, and a solution is sought, often with the assistance of specialists, school and community resources, and personal interviews in which the counselee is taught to make his own decisions.'

Pepinsky and Pepinsky (1954) define counselling with an emphasis on interaction: 'Counselling is that interaction between two individuals to find a solution to the problems, which have an emotional angle, of one individual. Such a solution usually includes behavioural change in the individual whose problems are being discussed.'

Smith (1955) defines counselling in a similar way but focuses on a range of issues. According to him, counselling is 'a process in which the counsellor assists the counselee to make interpretations of facts relating to a choice, plan or adjustments which he needs to make.

Hahn and Maclean (1955) maintain a similar view in general terms. For them, counselling is 'a process which takes place in a one-to-one relationship between an individual beset by problems with which he cannot cope alone and a professional worker whose training and experience have qualified him to help others reach solutions to various types of personal difficulties.'

Wrenn (1951) views the process of counselling as a dynamic one, which involves the participation of two parties on a discussion of their differences of approaches and expected outcomes: 'Counselling is a dynamic and purposeful relationship between two people in which procedures vary with the nature of students' needs, but in which there is always mutual participation by the counsellor and the student with the focus upon self-clarification and self-determination by the student.

Burks and Stefflre (1979) differed with the earlier views by saying that counselling may involve more than two persons: 'Counselling denotes a professional relationship between a trained counsellor and client. This relationship is usually person-to-person, although it may sometimes involve more than two people. It is designed to help clients to understand their self determined goals through meaningful resolution of problems of an emotional or interpersonal nature.'

6.4.1 Nature

Although all these definitions are based on certain commonalities, their approaches differ. These definitions suggest that counselling implies a number of characteristics, given as follows:

- In most cases, it is a dyadic situation that involves two persons, nominally a counsellor (a person who gives advice) and a counselee (person who needs advice). Sometimes, it may involve more than two persons.

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- A counselling session involves the exchange of ideas and the expression of feelings. Thus, it is an act of communication and introspection.
- The problems may relate to either the counselee's job or his personal life or both. Either of the two problems can have an effect on an employee's performance.
- Most problems that require counselling have an emotional aspect.
- The aim of counselling is to solve the problem under discussion.
- The discussions that take place during a counselling session are confidential. The idea is that the employees should feel comfortable to talk candidly about their problems.
- It helps improve organizational performance because the employee becomes more cooperative and worries less about personal problems. Hence, it gives the employee an opportunity to improve in other ways.

Need for counselling

The need for counselling arises from a variety of problems such as:

- Stress
- Insecurity
- Peer pressure
- Mental unrest
- Undergoing depression
- Emotional and physical challenges

6.4.2 Scope

The scope of counselling is wide. The counselling objectives are achieved through one or more of the following functions shown in Table 6.1. Some types of counselling perform one function better than another.

Table 6.1 Functions of Counselling

Advice	Telling a person what you think should be done; coaching
Reassurance	Giving people courage and confidence that they are capable of facing a problem
Communication	Providing information and understanding
Release of emotional tension	Helping a person feel free from frustration and stress
Clarified thinking	Encouraging more coherent, rational and mature thought
Re-orientation	Encouraging an internal change in goals, values and mental models

We will now examine how these six functions help in increasing the scope and achieving the counselling objectives.

1. Advice

People usually tend to view counselling as an advice-giving activity. But in reality, giving advice is only one of the several functions that counselling performs. Providing a 'solution to a problem' is an important outcome of counselling. However, one question that is often debated is: 'Should counsellors give advice to arrive at a solution or should they allow a counselee to come up with his or her solution?'

Those experienced in the art of counselling are not in favour of giving advice. To give useful advice, a counsellor has to make judgements about a counselee's problem and decide a course of action. This is both difficult and undesirable because of the following reasons:

- Understanding another person's problems is complicated and not easy.
- Telling the person to do something which is appropriate to the counselee and the situation is not that simple. It is difficult to know the future implications of a solution.
- Advice giving may breed a relationship in which the counselee feels inferior and dependent on the counsellor.

In spite of all these disadvantages, advice occurs in routine counselling at work because workers expect it and managers like to provide it.

2. Reassurance

Counselling can help reassure people and give them the courage to face a problem and instil a feeling of confidence that they are pursuing a suitable course of action. Reassurance is represented by such remarks as 'You are making good progress' or 'Don't worry, this will come out all right.' Reassurance is not without its drawbacks and fails under two situations:

- ***Lack of trust***: Counselees do not always trust the counsellor even if he may have the right solutions for their problems.
- ***Weak mind***: People with a weak mind may initially accept reassurance and show confidence. But their temporary self-confidence may fade as soon as they face problems again. Their false sense of self-confidence may even lead them to make poor personal decisions.

Though reassurance has its weakness, it is useful in some situations. Further, some counselees, especially those undertaking new assignments, look for reassurance and some managers feel like providing it.

3. Communication

Counselling improves interpersonal relationships in an organization. It can be a means to improve both upward and downward communication.

- ***Upward:*** Counsellors become aware of emotional and rational problems of employees and they can communicate the same to the top management. Of course, this should be done keeping individual names confidential.
- ***Downward***: Counsellors, in the process of counselling, can interpret the top management's approaches, values, goals and policies to employees.

4. Release of emotional tension

Some problems are real; some are simply mental ghosts.

- When the problems are real, people tend to get an emotional release from their frustrations through counselling. They become more relaxed and capable of thinking rationally and speaking coherently. Hence, their thinking is more constructive and they are able to work out a solution to the situation at hand.

- In some cases, people have no real problems, only perceived ones, which are actually products of their imaginations. In such cases, the release of mental tension itself is the solution.

5. Clarified thinking

Some people tend to magnify minor incidents and jump to drastic conclusions. Clarified thinking tends to be a normal result of emotional release. The counsellor serves as an aid to the emotional release and refrains from telling the counselee what is right.

Clarified thinking is a gradual outcome, which may not necessarily take place while the counsellor and counselee are interacting. It can be the result of post-counselling reflections.

6. Reorientation

Reorientation involves a change in the employee's self through a change in basic goals and values. Counselling can help people recognize and accept their own limitations and also identify their hidden potential.

6.4.3 Types of Counselling

Counselling can be classified in different ways.

1. Based on the counsellor's direction

Counselling involves direction by a counsellor to a client. Based on the degree of direction, a continuum of counsellor direction can be developed. A third type can be considered to be in between.

(i) Directive counselling

Directive counselling is counsellor-oriented. The process requires the counsellor to listen to a person's problem, decide with the person what he/she should do and motivate accordingly. This is a quick way to find solution to a problem.

(ii) Non-directive counselling

Non-directive counselling is at the opposite end of the continuum and is client-centred. This process requires the counsellor to skilfully listen to the counselee and encourage him or her to determine the appropriate solution. The unique advantage of non-directive counselling is its ability to cause a person's reorientation as it emphasizes changing the person instead of dealing only with the immediate problem.

(iii) Participative counselling

Participative counselling falls between the two extremes of directive and non-directive counselling and is known as the middle ground type. It is also called cooperative counselling.

A contingency view

A counsellor's decision to use directive, participative or non-directive counselling with a counselee depends on the specific situation. It should not be a blind, isolated and hurried decision. The following contingency factors may be kept in mind:

- ***Nature of problem*:** If a person's problem appears to be his inability to focus on facts and the need is for a timely, logical solution, a directive approach works best. If the problem is caused by personal feelings and emotions, then a non-directive approach is recommended.
- ***Time and effort:*** When the counsellor is willing to devote time and effort, non-directive counselling should be used. Otherwise, directive counselling is recommended.
- ***Preferences of counselees:*** When counselees seek a nurturing role, participative or non-directive methods of counselling should be employed. When they seek someone with job-related expertise or problem-solving skills, the directive approach works best.

2. Based on focus

Depending on the circumstances, different kinds of counselling are used.

(i) Problem-solving counselling

Problem-solving counselling is concerned with solving specific problems that may arise in the life of a person. This involves identifying and understanding the problems and then offering problem-specific solutions. These solutions are tried and then reviewed.

(ii) Interpersonal counselling

Interpersonal counselling is used for interpersonal relations, be it at the employee's home or workplace. This too involves identifying a problem and then finding and identifying ways to rectify it.

(iii) Psychodynamic counselling

Psychodynamic counselling focuses on the client's past experience or other unconscious processes to interpret current behaviour. Understanding such behaviour gives insights into the client's relation and other behavioural patterns.

3. Based on medium

In addition to face-to-face counselling, today, we also have telephone and online counselling methods. Demerits of these methods are as follows:

- They do not offer the counsellor any visual information based on the counselee's body language, which can provide many leads and clues for understanding the nature of the problem.
- Difficulty in establishing a relationship with the client. The telephone/online counsellor needs to put in extra effort to make the client comfortable enough without any eye contact, so that the client feels safe and confident and can open up to the counsellor.

Telephone counselling, nevertheless, has its own merits.

- It can be as constructive and supportive as face-to-face counselling. As distractions are kept to a minimum, it is easy to maintain concentration.
- Some clients are able to express themselves more freely over phone as they have a sense of anonymity and feel that they are maintaining confidentiality. Some people find telephone counselling safer than seeing a counsellor in person.

Similarly, the counsellor also finds it easier to terminate the session if they feel the client is not being honest enough.

- Since telephone counselling keeps the focus entirely on the problem, it is much sharper and can work better than counselling sessions in person do.

Despite their shortcomings, telephone and online counselling are popular. Online counselling is also becoming increasingly available and accessible. Telephone and email support may be more conducive in certain situations like when a client wants to:

- Discuss ways of resolving a problem
- Find the energy and courage to address a problem
- Understand the psychological aspects of a situation better
- Discuss ways to modify his or her behaviour
- Discuss ways to modify the behaviour of others in certain situations
- Find new ideas or gain new insights
- Access specialist knowledge and guidance
- Build on progress already made in sessions conducted by a counsellor in person

(iv) Eclectic counselling

Lazarus (1981) offers a multi-modal approach which includes an evaluation of the therapy procedure that is thought to be both relevant and applicable to stress management. (Palmer and Dryden, 1991, 1995)

Assumptions

Behaviour therapy has not always been successful as some important factors were not taken into account during the evaluation of the therapy outcome.

Role of counsellor

The framework of this approach comprises the following seven modalities:

- Behaviour
- Affect
- Sensation
- Imagery
- Cognition
- Interpersonal: This blueprint is known by the acronym BASIC ID and is used for the basic assessment of clients. During the assessment, the different modalities are examined by asking questions similar to the following:

  B—What do you wish to do/ not to do?

  A—What makes you happy, frustrated, sad, etc.?

  S—What do you like/dislike to hear, taste, etc.?

  I—What do you wish to do in the future?

  C—What are the main ethics and principles you live by?

  I—How do you get on with others?

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D—Do you consume any intoxicants? Do you take any medicines? Do you suffer from any chronic ailments? How is your physical well-being?

- Drugs/Biology

In order to optimize the therapeutic process and the time required for it, clients are given a questionnaire on their life and history and are asked to fill it in at home. The questionnaire also asks the client about the kind of approach he would like the counsellor to take and, based on the response, the counsellor identifies the approach to be taken for the therapy. The techniques most frequently used are in Table 6.2.

Table 6.2 Multi-Modal Therapy

Modality	Techniques
Behaviour	Behaviour rehearsal, Exposure programme, Modelling, Reinforcement programmes, Self-monitoring and recording, Shame attacking, Empty chair, Fixed role therapy, Psychodrama, Response prevention/cost Stimulus control, Paradoxical intention
Affect	Anger expression, Anger/anxiety management, Feeling identification
Sensation	Bio-feedback, Hypnosis Relaxation training, Threshold training, Meditation, Momentary relaxation, Sensate focus training, Relaxation response, Massage
Imagery	Coping imagery, Time projection imagery, Anti-future shock imagery, Mastery imagery, Positive imagery, Thought stopping imagery, Aversive imagery, Associated imagery
Cognitive	Biblio-therapy, Cognitive rehearsal, Disputing irrational beliefs, Problem solving, Challenging faulty inferences, Constructive self-talk, Thought stopping
Interpersonal	Assertion training, Contingency contracting, Fixed role therapy, Communication training, Friendship/intimacy training, Social skills training, Role play, Graded sexual approaches, Paradoxical intention
Drugs/biology	Lifestyle changes, Stop smoking programmes, Diet, Weight control, Exercise, Medication, Referral to specialists

Once the client's problems and the objectives required to be achieved are identified and evaluated, appropriate techniques of counselling are discussed and selected with the client's consent.

6.4.4 Goals and Importance of Counselling

Counselling is an important function both in the society and in organizations because people face various problems as students, employees and family members. When problems arise, the resulting emotions may cause instability and confusion, leading them to do things that are harmful to their own best interests and those of the organization. Emphasis on counselling helps the organizations to become more humanistic and responsive to the concerns of others.

Counselling can be general or specialized, depending on the nature of the problem. Therefore, counselling can be performed by both non-professionals and professionals.

The objectives of counselling are many. Some of them are as follows:

- To solve problems
- To support people to grow in self-confidence, self-direction and self-control
- To foster positive interpersonal relationships
- To create a climate of assurance and high morale for peaceful cooperation

These objectives are consistent with the latest transformational, collegial and system models of management leadership that require setting up of systems for mentoring, coaching and counselling.

6.5 QUALITIES OF A GOOD COUNSELLOR

To be successful, a counsellor should process some special capabilities. We will now discuss the essential qualities of a counsellor.

1. Social skills

The relationship between the client and counsellor is certainly professional but it requires a human touch to be fruitful. A person-to-person relationship can be a basic foundation for an effective counselling process. As such, counsellors need social skills to establish working relationships. The three most important requirements for counsellors are —credibility, confidentiality and attention.

(i) Credibility: Credibility is an important consideration in choosing a counsellor. It implies two things:

- Enhancing expertise by study and practice
- Creating trust by maintaining integrity in relationships

A counsellor will be successful only when he can apply knowledge of behavioural sciences to the art of counselling and guidance.

(ii) Confidentiality: Counselling takes place in privacy with an assurance of confidentiality. Confidential issues are fully discussed before embarking on the first session. Here, the parts of the discussion which cannot be revealed will be made clear to the counsellor. Counsellors are obliged not to reveal them to other professionals, friends or family members.

In the beginning, many people are nervous and evasive. Some may be wrought with inferiority complex. Social skills are required to make interactions smooth and pleasant. The idea is to make clients ready to face and work with their issues. At the end of the counselling process, they should feel liberated, self-empowered and stress free. As a part of social skills, encouragers are to be used.

(iii) Attention: Attention can be indicated by verbal messages and non-verbal signs. 'Hello! Please come in', 'How-do-you-do'-like greetings supported by statements like, 'Well! We will now examine your problems', or 'I am interested in knowing your mind or thoughts going on in your mind right now', can help create warmth in the ensuing relationship.

***Learning skills*:** Counselling is a process of learning about the client's situation and extending help. Each counselling instance is a case study to be added to the knowledge base and a source of new experience in learning.

Sensory skills: This refers to the sensitivity with which one has to grasp information. Endowed with five senses, we receive a lot of information from the environment and the people with whom we interact. Counsellors have to sharpen

Check Your Progress

10. Define counselling.
11. What is the use of interpersonal counselling?
12. How can counselling help people?

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their five senses in order to receive information from different perspectives. Some people have extra-sensory perceptions and some counsellors develop them. It means seeing beyond the obvious. It provides an unusual insight of others' views and enables interaction with them.

Perceptual skills: Perception is the way we see things. It is the process of understanding messages without gathering further information. Perceptual blocks reduce the ability to understand information correctly. It results in misinterpretation of the client and his issues. Forming quick impressions, stereotyping (women are weak, so Sujata is also weak), taking a neutral stance in evaluation (central tendency–not caring extreme points), attributing one quality to all other observations (he is good in mathematics, so he must be good in all other subjects), etc., are perceptual problems. It is important to check perception by cognition, to establish the right images or impressions. For instance, a client may appear to be rough and tough at first sight, but during interaction the counsellor may discover that he is soft and timid by nature.

Cognitive skills: Cognition is a process of learning. It is a process of asking why, what, where, who, when and how to know the different dimensions of a subject chosen for understanding. It is a process of reasoning to establish logical understanding of the phenomenon. The analytical thinking process goes like: I am unhappy because my boss has shouted at me. Why am I unhappy? Is it because I could not finish the work, or because my boss shouted at me, or used insulting words?

Reflexivity: It is to do with the ability to adapt to the mode of explanation of the client. As the client changes his or her ways of construing events, so too must the counsellor. The counsellor has to be involved in a reflexive process, seeking to make his or her own interpretation explicit by interaction with the client.

Suspension: A counsellor has to develop the skill of suspending his own judgement and construing events so as to subsume the client's reality.

Use of suspension is also found in reconstruction of what the client has said. A specific experience or event that does not fit in the structure of understanding may be suspended for a while. It is kept in memory to be used if found relevant in the reconstruction process at a later stage.

Dilation and constriction: These terms refer to re-organization of construing systems when dealing with incompatibilities.

Dilation: The client can dilate the perceptual field in the following ways:

- Behave aggressively and widen his areas of interest
- Jump from topic to topic and see possibilities everywhere
- Start seeing things as being related to his problem

Constriction: This is a process of limiting issues. It helps in dealing with chaos and anxiety by avoiding incompatibilities. It helps shrink the world to a manageable size.

Observation: In the interaction process, words and actions are related to the articulated and observed frame of reference in a flexible manner. Observation of the client's body language is important to make meaningful interpretation of messages. A counsellor needs meta-communication skills to 'see through' what the client says:

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Client: (loud, quick and harsh tone): My boss should not have spoken like that in front of my team members.

Counsellor: Your voice suggests that you are very irritated.

Client: Yes. You got me right. When I think of the incident, I experience a surge of anger.

Counsellors make notes of the discussion. This should not, however, interfere with the observation. If need be, a pause may be taken while making notes. Skill is necessary to balance observation and note taking.

***Communication skills*:** Communication is at the core of counselling. A counsellor should be effective in oral and non-verbal communication. He or she should be good in speaking and listening.

Attention: This is the most important skill required of a counsellor. If the counsellor does not pay attention to the client from the moment he enters the room, he feels unworthy of attention and develops anxiety. The counsellor's verbal and non-verbal messages together send powerful message of welcome to the clients. It should be like this when interpreted: 'Welcome. I am interested in you and in what you would say. I am willing to listen to your problems, understand your feelings and share your concerns.'

Non-verbal signals: The supporting non-verbal signals can be:

- *Posture*: Sit upright and relax. Do not slouch in the chair.
- *Eye contact*: Maintain direct eye contact, occasionally looking away from the client. The counsellor should not stare at the client; his looks should be comforting and invite the client to talk.
- *Facial expression*: The counsellor should smile with affection and show concern by remaining calm and observant, and not laugh.
- *Seating:* A distance of 3, 5 feet is appropriate. The chairs should be of equal height. They should be at 90 degrees to give freedom to the client to look at the walls or the counsellor.

Encouragers: A client may find it hard to continue talking and become silent. The role of the counsellor is to interpret the silence and if necessary break it. Some clients expect encouraging words of appreciation or inquiry to go on. So there is a need to use 'continuers'.

Continuers or encouragers can be verbal or non-verbal. They mean precisely that the counsellor is interested. Non-verbal expressions include smiles and grimaces, nodding the head, leaning forward, making sounds like 'umm, ahh', etc. The support can be expressed as follows:

- *Assertive:* 'I am listening', 'I am with you', 'I follow you', with a smile, nodding of the head, looking at the client and jotting down what the client is saying.
- *Permission*: 'I want to listen, please go ahead', with a curious expression on the face, eyes searching, head nodding and leaning forward.
- *Request:* 'I want to understand more about your experience', with an open posture, sitting upright and talking in a gentle voice.

- *Direction:* 'Can you tell me more about the incident that angered you last week…'? Or 'I'm curious about .....'

2. Listening skills

Listening in the context of counselling is called credulous listening. It starts with the belief that whatever the client is construing is true. However, that does not mean accepting the client's views without further questioning.

Listening is a complex activity because the human brain is a limited processor of information. The cognitive view of learning sees listening as a process with 'pre' activities, 'while' activities and 'post' activities.

A pre-listening task gives listeners the opportunity to use what they already know—their prior knowledge—to help them do the task. Prior knowledge is organized in schemata (the plural form of schema), also called internal frame of reference. It consists of abstract, generalized mental representations of our experience that are available to help us understand new experiences.

We process the information we hear in both top-down and bottom-up ways.

- *Top-down* means using prior knowledge and experiences; we know certain things about certain topics and situations and use that information for comprehension.
- *Bottom-up* processing means using the information we have about sounds, word meanings and discourse markers like *first, then* and *after that* to assemble our understanding of what we read or hear, one step at a time.

Counsellors need both bottom-up and top-down processing skills in listening. They must hear some sounds (bottom-up processing), hold them in their working memory long enough (a few seconds) to connect them to each other and then interpret what they have just heard before something new comes along. At the same time, listeners use their background knowledge (top-down processing) to determine meanings with respect to prior knowledge and schemata.

Listening can be done in two ways: listening for main ideas and listening for details. 'What's the most important idea in this conversation? What is the main thing they are talking about?' Speakers do not always say what they want to say. Sometimes they do not have clarity in their thoughts.

Listening is purposeful. Post-listening questions like '*what, how, how much*' can be useful to check whether purposeful understanding is achieved.

Feedback in the form of questions, paraphrasing, re-stating etc., is necessary to make listening effective. The reasons are as follows:

- Listening is a real time activity. There is no second chance unless, of course, the listener specifically asks for repetition.
- Listening involves understanding all types of reductions of sounds and blending of words. The listener needs clarifications.
- When there is a gap in understanding, listeners tend to 'fill in the blanks' with contextual guesses using their prior knowledge.

People do not always say exactly what they mean. That is, important aspects of meaning are sometimes implied rather than stated. Listeners have to 'listen between the lines' to figure out what really is meant.

Some listening problems arise due to individual learning approaches. These are as follows:

Problem of selective reception: Receiving requires not only an attentive ear but also an open mind. People tend to select the information that they think is useful and listen to that extent. In choosing what to receive, counsellors have to be careful. Key ideas are to be captured and listening should be done in a way to enhance their understanding.

Filtering: Understanding is influenced by filtering. People tend to wear coloured glasses of their choice and see the world through them. Such interpretations may be based on their own experience, and biases may be misleading. Care is necessary before establishing understanding.

Responding to the client's questions

In the process of interaction, clients may raise some questions and expect counsellors to respond appropriately. The questions may be about the client's own personality, behaviour or thoughts and the counsellor–client relationship. Some typical questions are as follows:

Client: Do you think I am a timid person?

Client: What do you think about my joining the new organization? Did I make a mistake?

Client: Am I troublesome, demanding more from you?

The counsellor has to think carefully before answering such questions. The nature of response depends on the following needs:

- *Need for assurance or sympathy*: In the early stages of counselling, the client views the counsellor as an expert and seeks guidance at each and every step; that is, his or her dependence is high. What the client needs perhaps is an encourager and not a specific answer to the question. In such cases, instead of answering a question, encouragement should be provided.
- *Need for advice*: Some clients look for an informative answer. As a part of counselling, expert advice of the counsellor is sought. In such cases, answers that extend professional help should be provided.

3. Spoken skills

Good communication is essential to counsellors. As you can see, each stage of the counselling process paves the way for another–providing a base for progression from ambiguity to clarity. As you move through each stage, you will gain an understanding of the problems, perspectives and insights. Counselling is essentially a communication process and counsellors should be good communicators.

4. Empathy

Empathy is the skill of listening to someone and understanding his feelings. It also helps clients understand themselves better and act accordingly. Table 6.3 shows the skills associated with empathy.

Empathy involves two major skills: perceiving and communicating

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According to Carl Rogers, 'To be with another in this way (empathetic) means that for the time being you lay aside the views and values you hold for yourself in order to enter another's world without prejudice. In some ways it means you lay aside yourself.'

To be empathetic is not an easy task. Here is a short check list to evaluate your abilities:

- Can I enter the private world of the client and see things as he or she does?
- Can I give up my temptation to evaluate and judge my client's views?
- Can I extend my understanding of the client's inner feelings as felt by him, without distortion?
- Can I sense the client's inner feelings which are dimly seen or mixed in confusion?

Table 6.3 Skills Associated with Empathy

S. No.	Skills	Explanation
1	Attending, acknowledging	Showing verbal and non-verbal indications: eye contact, smile, sitting upright, etc.
2	Re-stating, paraphrasing	Repeating what the client has said and building a question or a remark on it.
3	Reflecting	Inquiring based on feelings, experiences or content that the client has expressed.
4	Interpreting	Offering a tentative interpretation about the other's feelings, desires or meanings.
5	Summarizing, synthesizing	Synthesizing feelings and experiences to gain focus on what to explore further.
6	Probing	Questioning softly and intelligently to secure more information, clearing doubts and opening new vistas.
7	Giving feedback	Sharing information to indicate attention and understanding, and encouraging exploration and problems solving.
8	Supporting	Showing warmth and care to create confidence and affection.
9	Checking perceptions	Evaluating to establish significance, relevance, accuracy and completeness of information for decision—making.
10	Being quiet	Not to push the client. To be a sounding board for the client to reflect and think about issues for a while.

Source: A modified version of Pickering Marie Sue, 'Communication' in *Explorations,* Journal of Research of the University of Maine, Vol. 3, No. 1, Fall, 1986, pp. 16–19.

Subsuming: This is more than empathy. The counsellor actually strives to move along those inner pathways of the client's experience for a short period of time to gain understanding.

Check Your Progress

13. What is the basic requirement for an effective counselling process?
14. What are the three most important qualities of a counsellor?
15. What do sensory skills refer to?
16. What do you understand by cognition?

6.6 SUMMARY

In this unit, you have learnt that:

- All of us get to learn life lessons from the older and more mature people around us. Since life is constantly changing in its dynamics and demands on us, we need to be guided, in terms of home life, professional life as well as education. Some people need less guidance than others. But everyone feels the need for guidance and counselling at some point in time.

NOTES

- The term 'guidance' represents a concept that is neither simple nor easily understood. The complexity of human nature, developmental differences even among off-spring of the same parents, personal and social problems associated with changing environmental conditions and cultural mores –all require that for various guidance approaches to be utilized.
- Guidance is an old concept but is still developing. It is still largely an unorganized and informal process in many places, such as when guidance is sought from parents, grandparents, astrologers, palmists, numerologists and so on. However, lately, schools have begun employing a professional guidance counselor who comes in every day and all students are encouraged to take their problems to him/her.
- Guidance cannot be considered independent of an individual. The main aim of this process is to assist in the development of an individual keeping in view the societal boundaries and requirements.
- Guidance is both a specialized and generalized service in which a teacher, parents and counselor, all play important roles. But, like other services, guidance service also needs trained staff so that this process may work smoothly.
- Principles of guidance can be defined as a set of guidelines for conducting a guidance process. Principles explain how something should be done. In order to run a guidance programme successfully, it is essential to understand the principles, along with the meaning of guidance upon which the guidance process is based.
- Some psychologists define personality in terms of social stimulus value, by which an individual can influence other persons he meets on his way. Using this definition we can evaluate a person, from his appearance and mode of talking. We can gather an idea of whether he is impressive or repulsive, dominating or submissive, and so on, from the impression he leaves on us by his physical appearance, clothing, conversation and etiquette.
- There are as many types of guidance as there are problems confronting any youth. The Central Bureau of Educational and Vocational Guidance in Delhi has suggested three kinds of guidance. These are— educational guidance, vocational guidance and personal guidance.
- The term 'personal guidance' refers to the help given in the development of the individual as a person, not merely as worker or a student but as a growing or developing personality that works in an integrated pattern of life.
- Vocational guidance is guidance given to a person chiefly about vocational problems. It had its beginning in Parsons' vocational study which was completed by him in 1908 at Boston in America.
- Educational guidance is a specific area of guidance which takes care of students' problems which contributes to their educational progress and experiences. Educational guidance is a process of creating favourable conditions for the pupil's development or educational progress.
- Counselling involves discussions and interactions between a person who has a problem that needs to be solved, and a person who helps him identify ways in which to solve the problem.

- Counselling can help reassure people and give them the courage to face a problem and instil a feeling of confidence that they are pursuing a suitable course of action.
- The counsellor serves as an aid to the emotional release and refrains from telling the counselee what is right.
- Counselling can help people recognize and accept their own limitations and also identify their hidden potential.
- Non-directive counselling was developed concurrently by two groups: Elton Mayo Roethlisberger and others at Western Electric Company and Carl R. Rogers and his colleagues.
- Counselling is an important function both in the society and organizations because people face various problems as employees and family members.
- The practice of counselling is as old as the human civilization.
- Counselling gained momentum in the early part of the twentieth century as a guidance function and, within a short span of six decades, emerged as a profession of significance.
- Counselling, as an individual field of study and activity, has evolved over the years and has incorporated important findings of personality theory, social psychology, counselling psychology and therapeutic techniques.
- Rational behaviour is positive as it produces desirable productive outcomes and happiness or satisfaction.
- The counsellor encourages his clients to play an active role and apprises them when they act responsibly and indicate disapproval when they do not.
- The role of the counsellor is to identify and restore the damaged ego and develop the client's capacity to use all ego states appropriately, especially that of the adult, which is needed to govern one's life.
- Therapist assists the client towards self-integration and towards learning to utilize his energy in appropriate ways to grow, develop and actualize.
- There are various methods which can be used to communicate. These are oral communication, written communication, verbal communication and non-verbal communication.
- An oral communication is known as face-to-face communication and may be in the form of direct talk and conversation or public address.
- The relationship between the client and counsellor is certainly professional but it requires a human touch to be fruitful.
- Research shows that at the workplace, on an average, personnel spend about 32.7 per cent of their time listening, 25.8 per cent of their time speaking and 22.6 per cent of their time writing.

6.7 KEY TERMS

- **Personal guidance:** The term 'personal guidance' refers to the help given in the development of the individual as a person, not merely as worker or a student but as a growing or developing personality that works in an integrated pattern of life.
- **Vocational guidance:** It is guidance given to a person chiefly about vocational problems.
- **Educational guidance:** It is a specific area of guidance which takes care of students' problems which contributes to their educational progress and experiences.
- **Re-orientation:** It is a change in the employee's self through a change in basic goals and values.
- **Problem-solving counselling:** It is concerned with solving specific problems that may arise in the employee's personal or professional life.
- **Psychodynamic counselling:** It focuses on the client's past experience or other unconscious processes to interpret current behaviour.

6.8 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Guidance is assistance made available by professionally qualified and adequately trained men and women to individuals of all ages.
2. Before professional counsellors came into the picture, teachers used to fill the role of providing awareness and encouragement to their students to help them overcome problems faced during learning and adjustment.
3. One of the objectives is to assist children in developing physical and emotional stability.
4. According to Jones, the principles of guidance are as follows:
   - Principle of individual differences
   - Principle of specific abilities that are not innate
   - Principle of need of assistance in solving the problem of the individuals
   - Principle of developing self-guidance
   - Principles of important role of school in providing guidance
5. Psychological needs are as follows:
   - Psychology of individual differences
   - Proper adjustment
   - Emotional problems
   - Personality development
6. These are— educational guidance, vocational guidance and personal guidance.
7. Vocational guidance is a process of assisting the individual to choose an occupation, prepare for it, enter into it and progress in it.
8. One of the needs is to check wastage and stagnation in education.
9. While taking the interview and collecting information, a profile of the student should be made so that any information about pupils can be easily viewed at any time. In short, a profile is like a snapshot of a pupil's life.

10. Counselling can be defined as a process that involves discussions and interactions between a person who has a problem that needs to be solved, and a person who helps him identify ways in which to solve the problem.
11. Interpersonal counselling is used to identify the problem area and identify the ways to rectify it.
12. Counselling can help people recognize and accept their own limitations and also identify their hidden potential.
13. A person-to-person relationship is the basic requirement for an effective counselling process.
14. The three most important qualities of a counsellor are as follows:
    (i) credibility
    (ii) confidentiality
    (iii) attention
15. Sensory skills refer to the sensitivity with which one has to grasp information.
16. Cognition is a process of learning. It is a process of asking why, what, where, who, when and how to know the different dimensions of a subject chosen for understanding.

6.9 QUESTIONS AND EXERCISES

Short-Answer Questions

1. Define guidance. Why guidance is important in today's world?
2. Write at least two popular definitions of guidance and analyse them for meaning.
3. List the objectives of guidance.
4. Define personal guidance and outline the procedure of personal guidance.
5. Outline the role of teacher in guidance and counselling.
6. Outline the role of guidance for the community in general.
7. State the functions of counselling.
8. What are the qualities of a good counsellor?
9. Differentiate between verbal and non-verbal communication.
10. Write down the goals of counselling.

Long-Answer Questions

1. Explain the nature of guidance.
2. What are the principles of guidance and counselling?
3. Write about need for guidance from a sociological point of view.
4. Explain the meaning and need for vocational guidance.
5. Provide the definition, objectives, and need for educational guidance.
6. Explain the types and importance of counselling.

7. Describe the growth process of counselling.
8. Discuss in detail the different approaches to counselling.
9. What are the advantages and disadvantages of verbal and non-verbal communication? Explain.
10. Has counselling become a necessity in today's lifestyle? Give a logical answer.

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UNIT 7 TECHNIQUES OF GUIDANCE AND COUNSELLING

Structure

7.0 Introduction
7.1 Unit Objectives
7.2 Testing Techniques
  7.2.1 Aptitude
  7.2.2 Interest
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7.3 Personality and Creativity
  7.3.1 Personality
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7.7 Answers to 'Check Your Progress'
7.8 Questions and Exercises
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7.0 INTRODUCTION

Sometimes, we take the three concepts aptitude, skill and proficiency, as synonymous. However, there is difference between these. From intelligence test, we cannot judge the aptitude of an individual because intelligence is a general ability, whereas aptitude is a specific ability. So, when we predict the future of an individual, we should go for aptitude testing rather than intelligence testing. Interest and aptitude both have positive correlation but it does not mean that attitude and interest are the same. An individual with interest and aptitude for teaching will get success in profession life, but if only interest is present without aptitude, the question of success will arise.

Human behaviour is a reflection of psychological traits. A person's behaviour determines his personality and personality is an expression of his aptitude, intelligence, motivation and interest. The person's success in life is mostly determined by his interest in it. Interest includes all the psycho-physical dispositions, which distinguish one individual from another. One's interest determines his educational and vocational achievement, utilization of leisure hours, interaction with the society and interpersonal relations.

In psychology, intelligence remains, till date, one of the most widely discussed areas of inquiry. As there is no one definition of intelligence, several researchers and theorists have attempted to define and understand its functioning. While some insist that intelligence is a single ability, others believe it contains a range of aptitude, skills and talents.

NOTES

In this unit, some of the most commonly used tools or techniques for data collection like observation, questionnaire and interviews are discussed. Each of these tools differs in their nature and scope. The researcher has to bear in mind the suitability of these tools, i.e., relevancy and effectiveness depending upon the type of problem under consideration.

7.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Explain the uses of aptitude test
- Describe different methods of measuring interest
- Comprehend the different ways in which general intelligence is measured
- List different methods for assessing personality
- Describe the concept of creativity and its theories
- Evaluate the methods of testing creativity
- Discuss the importance of various tools of educational research like observation, questionnaires and interviews

7.2 TESTING TECHNIQUES

Testing techniques should be aimed at providing accurate and comprehensive information about an individual. Going forward we would see the areas where such techniques are used.

7.2.1 Aptitude

Bingham defined aptitude as 'a characteristic or set of conditions that are symptomatic to the individual's ability to acquire with some specified training, some knowledge or skill or a set of responses in a given field'. Aptitude refers to a special capability of an individual, which makes him distinct from others in an achievement field. It signifies the potentialities with an individual at present with future predictive reference. The word 'aptitude' is derived from the Latin word *'aptos'* which means 'fitted for'. Aptitude of an individual towards some work fits him in the work like round peg in the round hole and square peg in the square hole. The concept of aptitude does not have the good or bad value judgment. It only bothers about the degree of aptitude like high aptitude or low aptitude. It just means that an individual fits into the requirements of one profession better than into another. For example, Kavita performs well in singing without any formal training, but after a rigorous training she does not perform well in teaching profession. So, here Kavita has higher degree of aptitude in singing than teaching.

Traxler states: 'Aptitude is a condition, a quality or a set of qualities in an individual which is indicative of the probable extent to which he will be able to acquire under suitable training, some knowledge, skill or composite of knowledge, understanding and skill, such as ability to contribute to art or music, mechanical ability, mathematical ability or ability to read and speak a foreign language.' Freeman stated that 'an aptitude is a combination of characteristics indicative of an individual's capacity to acquire (with training) some specific knowledge, skill or set of organized responses, such as the ability to speak a language, to become a musician to do mechanical work'. According to Warren, 'aptitude is defined as a condition or set of characteristics regarded as symptomatic of an individual's ability to acquire with training some specified knowledge, skill or set of responses such as the ability to speak language, to produce music etc'.

NOTES

Characteristics

The characteristics of aptitude are as follows:

- Aptitude is an ability to learn
- Aptitude is an integral part of personality
- Degree of aptitude determines one's success in particular work
- Aptitude predicts the future of an individual
- Aptitude is a present condition with a future reference
- Aptitude is the product of heredity and environment
- Aptitude of an individual is relatively stable
- There is inter- and intra-individual difference in aptitude
- An aptitude must be developed by practice and training to become an ability
- Aptitudes are normally distributed
- Aptitude can be measured quantitatively and qualitatively

Types

There is individual difference in aptitude. Everybody has different kinds of aptitude. Two individuals may have aptitude of one kind but the degree of aptitude will be different. So there are different kinds of aptitude which are as follows:

- Mechanical aptitude
- Clerical aptitude
- Aptitude in music
- Aptitude in law
- Teaching aptitude
- Aptitude in medicine
- Aptitude in art
- Aptitude in science
- Aptitude in engineering
- Manual aptitude
- Aptitude for military career
- Aptitude for research

Aptitude test

According to F.S. Freeman, 'An aptitude test is one designed to measure a person's potential ability in an activity of a specialized kind and within a restricted range.' Aptitude of an individual can be measured with the administration of test. Aptitude tests measure the ability of individual's to learn new tasks. Aptitude tests assess the degree of an individual's inclination towards something. Aptitude tests help the individuals in their selection of courses and careers. These tests are also helpful in provision of guidance and counselling and predicting the future development of an individual. An aptitude test of high validity, reliability and objectivity clearly predicts an individual's future.

Types of aptitude tests

Aptitude tests are divided into three types according to their quality of testing. The three types are as follows:

1. **General aptitude tests (GATs):** General aptitude tests are also known as scholastic aptitude tests. GATs measure the general intelligence, mental ability and learning ability of individuals. This type of test predicts the future progress of an individual to a lesser extent. This test is known as scholastic aptitude test because it predicts student's academic achievements in schools. This type of test is divided into four types:
   (i) Tests of vision and hearing
   (ii) Tests of reading and writing
   (iii) Tests of remembering and forgetting
   (iv) Tests of understanding

   Minnesota Paper-Form Board is a good example of General Aptitude Test.
2. **Specified aptitude tests (SATs):** This type of tests generally concentrates upon the assessment of an individual's ability in a special field. Through this test, an individual's area of special aptitude is known with the degree or level. Upon the result of this test, students are given educational and vocational guidance. Mechanical aptitude tests, musical aptitude tests, teaching aptitude tests, etc., come under specified aptitude tests. Seashore Measures of Musical Talent and Horn Art Aptitude Inventory are good examples of Specified Aptitude Tests.
3. **Differentiated aptitude tests (DATs):** Differential Aptitude Tests are developed for measuring the fundamental intellectual abilities within individuals. The first edition of the DAT battery was published after World War II, by the Psychological Corporation.

   The widely used Differentiated Aptitude Tests are as follows:
   (i) Armed Services Vocational Aptitude Battery (ASVAB)
   (ii) General Aptitude Test Battery (GATB)
   (iii) Aptitude Classification Tests (ACT) and others

The most important DAT is developed by American Psychological Corporation. The battery of tests developed by Bennett Seashore and Wesman under GAT are given as follows:

(i) Verbal Reasoning Tests of 30 minutes
(ii) Language-spelling and Sentences Test of 35 minutes
(iii) Clerical Speed and Accuracy Test of 6 minutes
(iv) Numerical Ability Test of 30 minutes
(v) Abstract Reasoning Test of 30 minutes
(vi) Mechanical Reasoning Test of 30 minutes
(vii) Space Relation Test of 30 minutes

Let us explain some of the important aptitude tests with their widely used tests.

1. *Mechanical aptitude tests:* Mechanical aptitude of an individual refers to his psychomotor activities. It involves manipulation of objects and tools with a mechanical bent of mind. According to Bingham, factors in mechanical success are space relations, mechanical comprehension, perceptual acuity and manual dexterity. Engineers and machine designers have high levels of mechanical aptitude. Persons having high degree of mechanical aptitude get success in engineering than the others. In this field, machinists or technicians are at the lower ebb and engineers at the higher ebb. Some widely used mechanical aptitude tests are as follows:
   (i) Bennet Tests of Mechanical Comprehension
   (ii) S.R.A. Mechanical aptitude test
   (iii) Minnesota mechanical assembly tests
   (iv) Stenquist mechanical aptitude tests I and II
   (v) Sharma's mechanical aptitude test battery
   (vi) Jayendra's mechanical aptitude test
2. *Clerical aptitude tests:* According to Bingham, clerical aptitude also involves several specific abilities like perceptual ability, intellectual ability and motor ability. In the words of Super, clerical aptitude refers to 'the ability of routine clerical work'. According to Bills, 'Clerical aptitude includes the gathering, classification, and presentation of data of all sorts, analysis and use of these data in planning, executing and determining the results of operation'. Clerical aptitude includes noting, drafting, continuous routine work, knowledge of language, perceptual speed and accuracy, arithmetical calculations etc. Some widely used clerical aptitude tests are as follows:
   (i) Minnesota clerical aptitude tests.
   (ii) Detroit clerical aptitude examination.
   (iii) A test of clerical aptitude by T.P. Lele and others.
   (iv) A battery of clerical aptitude tests by Kiran Gupta.
   (v) Clerical ability test by Central Bureau of Educational and Vocational Guidance, Delhi
3. *Teaching aptitude tests:* Teaching aptitude of an individual is known by his interest in communication interaction, expression, creativity, listening, speaking, reading, writing, imagination, interest in both curricular and co-curricular activities, research bent of mind etc. A person of high teaching aptitude becomes a good teacher. Some important teaching aptitude tests are as follows:

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(i) Teaching aptitude test by R.P. Singh and S.N. Sharma

(ii) Teaching aptitude test by Jai Prakash and R.P. Srivastava

4. *Tests of scholastic and professional aptitudes:* In order to set the students in right place, some tests are developed. These tests help in the selection of students for admission to different academic and professional courses like MBA, MCA, Medical, Engineering, etc.

   Some of the tests of scholastic and professional aptitudes are as follows:

   (i) Minnesota engineering analogical test

   (ii) Stanford scientific aptitude test by D.L. Zyve

   (iii) The American Council of Education Scholastic aptitude test

5. *Scientific aptitude tests:* Scientific aptitude refers to the aptitude in deduction, induction, analysis, synthesis, judgment, understanding, logical thinking, convergent and divergent thinking etc. A scientist always looks a thing from scientific angle. The falling down of apple from the tree towards the earth is a general concept for a common man, but Newton's scientific attitude helped him to think about it which resulted in the gravitational force of earth. Men of scientific aptitude are very much creative. In order to assess the scientific aptitude, the tests used are as follows:

   (i) K.K. Aggarwal's Scientific Aptitude Test battery

   (ii) Scientific Knowledge and Aptitude Test by S. Chatterjee and M. Mukherjee

   (iii) Science Aptitude Test, Department of Science Education, NIE

6. *Musical aptitude tests:* Musical aptitude refers to the aptitude for singing, playing musical instrument, listening music etc. For success in the musical profession, a couple of things are necessary like manual skill in playing instrument, clear and sweet voice, creative imagination, emotion for music, knowledge of rhythms, etc. Renowned musicians have high degree of musical aptitude. Some examples of musical aptitude tests are as follows:

   (i) Seashore Measure of Musical Talent

   (ii) Lundin's Battery of Five Tests

   (iii) The Wing Standardized Tests of Musical Intelligence

All the tests include Chord analysis, Melodic transposition, Pitch change, Rhythmic accent, Phrasing, Loudness, Tonal memory etc.

Merits of aptitude tests

Aptitude test has the underlined uses:

1. It helps in providing guidance and counselling to the students
2. It helps the students in selection of their career and profession
3. It helps in admitting candidates for various types of academic and professional courses
4. It properly anticipates the future progress of an individual
5. It helps the students in development of special traits
6. It helps the students to become efficient personnel in their working field
7. It helps to diagnose the inter- and intra-individual difference

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7.2.2 Interest

Interest motivates the individual towards success. It is an expression of one's likes and dislikes or attraction and aversions. Interests vary with time to time and place to place. In a nutshell, interest is not static; rather dynamic and shaped by both heredity and environment. It is an expression of one's likes and dislikes or attraction and aversions.

Guilford states, 'Interest is a generalized behaviour tendency of an individual to be attracted to a certain class of incentives or activities that are vocational in nature and to those whose broad meanings transcend vocations.' Murphy states, 'interests are conditioned stimuli related to goal objects and expressed as likes or dislikes of activities, objects, characteristics or people in the environment'.

Characteristics

The characteristics of interest are as follows:

1. Interests are the product of heredity and environment
2. Interests vary with age and place but relatively stable
3. There is inter- and intra-individual difference in interest
4. Interest determines one's personality
5. There is positive correlation between interest and achievement
6. Interest can be measured
7. Interests are not necessarily related to ability or aptitude
8. Being a subjective concept, measuring on interest objectively is tough

Types

Some interests are expressed by the individuals verbally, some interests are known by different kinds of testing, and some interests are reflected in the work. Taking into consideration all these factors, classified interest into four types:

1. Expressed interests
2. Manifested interests
3. Tested interests
4. Inventoried interests

According to Maclean, interests are of three types. These are as follows:

1. Expressed interests
2. Observed interests
3. Measured interests

Expressed interests refer to the verbal expression of an individual towards an object, place, person, activity or profession. Here, there is no necessity of observation or use of different kinds of tests to know about the interest of an individual. The

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1. What is 'aptitude'?
2. State three important types of aptitude.
3. What are the types of aptitude tests?

individual himself says about interest. For example, Rama says 'I have interest in cricket.'

Manifested interests refer to the active participation of an individual in a particular type of work or activity. In case of manifested interest, the interest of an individual is observed, that is why it is known as observed interest. For example, Ram is a boy of 10 years. Most of the time, he is engaged in art and painting. So, it is observed that Ram has interest in art and painting. Here, it is not necessary on the part of an individual to verbally express his interest. His interest is manifested in his activity. In case of tested interests, the interests of an individual are tested by different kinds of objective tests. These types of interests are also known as 'measured interest'. Here, observation on the part of the tester and expression on the part of the testee is not necessary.

Inventoried interests refer to the interests which are expressed through standardized subjective tests. Interests of an individual are inventoried by different subjective expressions of an individual. The Strong Vocational Interest Blank and the Strong Campbell Interest inventory are the examples of inventoried interest inventory.

Interest factors

There are different interest factors. Some people have interest in business, some has interest in science, some has interest in spiritualism etc. Taking into consideration all these factors, Guilford has explained seven interest factors. They are as follows:

1. Mechanical interest
2. Clerical interest
3. Business interest
4. Scientific interest
5. Aesthetic interest
6. Social interest
7. Outdoor interest

Mechanical interest includes the interest in mechanical and manual activities. The engineers, diploma-holders have high degree of mechanical interest.

Clerical interest refers to the interest in official activities. Register maintenance, up-to-date reporting, number manipulation etc., are the area of concerns of the people of clerical interest.

The people with interest in business are interested in business administration, selling, buying, commerce, profit and loss etc. For them, official matters are of no concern. The commerce students, BBA and MBA students have high degree of business interest.

Scientific interest refers to the interest of the people in scientific activities. Most of the time, they involve themselves in convergent and divert thinking, scientific investigation, scientific task, logic, scientific theories, induction and deduction etc. For them, every happening in this world has a scientific cause. Scientists have high degree of scientific interest in them.

Aesthetic interest refers to the interest in aesthetic activities like enjoying the nature, appreciating aesthetic talents, enjoyment of arts and paintings, involvement in dramatic and musical activities. Poem writing, novel writing, making handicrafts are

the reflections of aesthetic interest of the people. The men of social interest involve themselves in social activities and social welfare. Their degree of being social is more in comparison to others. Taking responsibility, helping others, upliftment of the downtrodden, social equity and equality are their aims. They give importance to their society rather than their family.

Outdoor interests are of different kinds like interest in gardening, farming, forestry, agriculture etc.

Methods of measuring interest

Different methods are used for measuring or assessing interests of people. The important methods are as follows:

1. **Observation:** Through observation we can assess interests of people. Generally people manifest their interest in different kinds of activities. Participant and non-participant observation help in measuring the interest of individuals.
2. **Interview:** Interview is also a good technique to assess interests. Through interviews, people express their interests verbally. It is less time consuming and easy-going.
3. **Checklist:** In a checklist, items of different interests are given and the testee is supposed to check the items according to his interest. From this, the individual's interest can be assessed.
4. **Rating scale:** Rating scale expresses the degree or level of interest of an individual towards some activity. Rating scales are mostly helpful in career guidance to the students.
5. **Questionnaire:** Through questionnaire, we can get the knowledge of an individual's interest. The questionnaires either be sent to the people by post or the examiner can conduct an oral test. It reflects people's hidden interests.
6. **Tests:** Different kinds of tests are also used to assess interest. The tests may be subjective or objective. For example, for admission in B.Ed. course, there is an entrance test for the students. The students' appearing of the entrance reflects their interest towards teaching profession.
7. **Interest inventory:** Interest inventory provides information about the student's preferences which are more static than the expressed interests. Interest inventories are mostly used to assess the interest of people.

Interest testing and interest inventory

People's interests are tested for different purposes. Let us sum up the purposes of interest testing as follows:

1. Interest test helps in career selection for the students.
2. It helps in provision of educational and vocational guidance, and counselling to the students.
3. It predicts the success of students in future.
4. It provides information to the teachers and counselors regarding students' preference.
5. It helps the parents to nurture their children according to their interest.

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6. It helps the youths to channelize their energies in different directions.
7. It helps in selection of right person for the right work like round peg in the round hole and square peg in the square hole.

Interest inventory is a device which is prepared continuously to know the likes and dislikes of an individual in vocations and works. Some interest inventories are also made for educational curricula or field of study, which is important for career selection. They are mostly used for vocational counselling. They can be given to a group or to an individual. They are useful for both the counselors and the counselees. Some of the important interest inventories are explained as follows:

1. Kuder interest inventories

Frederic Kuder developed his interest inventories from different angles. Every interest inventory has a distinguished purpose. The interest inventories developed by Kuder are: Kuder Vocational Preference Record, Kuder General Interest Survey (KGIS), and Kuder Occupational Interest Inventory (KOII).

Kuder Vocational Preference Record has been developed for high school and college students which consists of 10 interest scales plus a verification scale for identifying some factors related to vocations. All the scales include the vocations like clerical, scientific, artistic, mechanical, outdoor, computational etc. Forced-choice triad items are used in the scales and each item of this inventory consists of three preferences such as: (a) Study economics, (b) Study gardening, and (c) Study law education. The respondents are supposed to check the answers they like the most and the least. It consists of 198 items in toto. This interest inventory is useful for classification and selection of people for different kinds of occupations.

Kuder General Interest Survey (KGIS) was developed later as a revision and extension of Kuder Vocational Preference Record.

2. Strong Interest Inventory (SII)

It was developed by E.K. Strong. The first edition of this Strong Vocational Interest Blank (SVIB) took place in 1927. In the beginning of 1970s, some changes and innovations were introduced in SII. The latest edition of SII was published in 1994. The present SII consists of 317 items grouped in 8 parts. In the five parts, the respondents are supposed to mark L, I or D to indicate Like, Indifferent, or Dislike. Items of these five parts include occupations, school subjects, activities, leisure activities, and day-to-day contact with the society. SII is scored only by computer at scoring centres designated by the publisher or with the use of software available from the publisher in a variety of options. All the scores on SII are reported at standard scores with a mean of 50 and standard deviation of 10.

3. Minnesota Vocational Interest Inventory (MVII)

It was developed for men oriented towards skilled and semi-skilled trades. This interest inventory consists of basic interest areas including mechanical interest, food service, electronics, and 21 specified occupational scales like carpenter, plumber and truck driver, etc.

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4. Interest schedule

This was developed by L. L. Thurstone. In this schedule, the individual is supposed to express his degree of preference for different kind of occupation mentioned in the schedule. All the occupations are given in pairs and the subject is to draw a ring around an occupation which prefers most out of the two. He can draw rings around the both if he likes them, and also he can reject both occupations if he dislikes by crossing them out.

Types of interest inventory

There are two types of interest inventory used. These are as follows:

1. Vocational interest inventories
2. General or non-vocational interest inventories

In vocational interest inventories, all the items are related to different kinds of vocations. The subject checks the items as he likes and this help him in selection of occupation.

On the other hand, 'non-vocational interest inventories' are related to the daily life and academic interest of the subject. Checklists, questionnaires, writing styles are mostly used in this type of inventory to assess the subject's interest in relation to academics and daily life.

7.2.3 Intelligence

General intelligence or *g* factor refers to the existence of intelligence that enhances mental ability measures.

Measurement of general intelligence

Different psychologists have attempted to define intelligence in different ways. It is a broader concept that consists of several cognitive functions like discrete abilities, capacities for abstract thought, understanding, communication, reasoning, learning from past experiences, planning, and problem solving. However, intelligence can be understood as a general set of mental abilities. We have already learnt that individuals differ from one another in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning and to overcome obstacles.

Intellectual performance of a person will be different on different occasions, in different domains, as judged by different criteria. Hence, these individual differences can be substantial, but they are never consistent.

Individual differences

The science of individual difference psychology focuses on the differences and similarities among people, in terms of their thinking process, feelings and behaviour. For instance, individuals are categorized as per intelligence levels and personality traits. However, the human mind is a complex, multi-layered structure and there are many theories and evidences that study the various aspects of psychological differences. Individual difference is considered a key subject area in modern psychology. Broadly speaking, it is actually the 'classic' psychology that laymen refer to when they mention

Check Your Progress

4. What are the types of interest?
5. State two important methods for testing interest.
6. What is interest inventory?

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the word 'psychology' for a person, in terms of the differences and similarities among people. In fact, more than 2000 years ago, Plato proclaimed that 'no two individuals are born exactly the same; and each differs from the other in natural ways, such as appearance, voice and intelligence, and also each individual has different aptitudes and skills'.

Individual difference psychology recognizes that no two people are exactly the same, and no two people are exactly the opposite of each other; there will be some similarities. So, when we study individual differences psychology, we are actually trying to understand how individuals have common attributes psychologically and specifically which psychological traits are different for human beings to react so differently. In the West, in the psychological study of individual differences, the following assumptions are generally made:

- Individuals are different in terms of a variety of psychological characteristics
- These individual differences are distinct and can be studied and measured
- The study of individual differences helps explain and predict behaviour and performance

So, it is possible to classify people in psychological terms, such as according to intelligence levels and personality traits. However, these are just a drop in the ocean because human beings are extremely complex and the science of psychology is still evolving. Because of this, there are several, and many a times contradictory theories and evidence about individual difference psychology. Human beings have always tried to categorize the society because they could feel individual differences. Some examples from history are as follows:

- **Classification as per gender:** Men were hunters because they were stronger physically, and women were gatherers.
- **Classification as per intelligence:** Each member of a community had a specific position, based on his or her caste, class, education, among others.
- **Classification as per personality traits:** An individual's personality traits were used to determine the kind of work he or she would do, such as a strong, well built man could join the army as a warrior.

Early study of individual difference

In the early 1800s, Franz Gall came up with the theory of phrenology, which studies the bumps on the skull of an individual. As per phrenology, skull bumps reveal personality traits and mental capacity. By the year 1832, phrenology had gained so much prominence that there were twenty-nine phrenological societies in Britain. Besides this, in US as well as UK, many journals were started which were dedicated wholly to the science of phrenology. At this time, it was even being said the members of parliament should be selected on the basis of their skull bumps. A few phrenologists even recommended that children's skull bumps be molded such that positive traits were enhanced and negative traits were minimized. It was eventually proved that the theory of phrenology was inaccurate. However, one of its premises—each region of the brain performs a particular function turned out to be accurate. Sir Francis Galton (1822–1911) stated that this premise could be applied scientifically, such that human

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traits could be measured and breeding done in such a way that only selective traits passed on to the next generation, eliminating the negative traits.

However, the underlying assumption Dalton made here was that all primary human traits, such as height, beauty, intelligence and natural ability and even personality traits like calm disposition, were genetic. Over the last century, modern psychology has contributed to serious, formal study of individual differences. However, this branch of psychology is quite recent, and is still evolving. There are many contradictions and controversies. Gradually, all these differences will be sorted out if we are ready to embrace viewpoints different from our own; especially those that are accepted in modern psychological practice and rely on thorough research methodology.

Thinking, reasoning and concept formation

The psychology of reasoning is the study of how people think and reason. It is often broadly defined as the process of drawing conclusions to inform how people solve problems and make decisions. It is at the intersection of psychology, philosophy, linguistics, cognitive science, artificial intelligence, logic and probability theory. Psychological experiments on how humans and other animals' reason have been carried out for over 100 years. An enduring question is whether or not people have the capacity to be rational. What does it mean to be rational? Current research in this area addresses various questions about reasoning, rationality, intelligence, relationships between emotion and reasoning, and development.

Everyday reasoning

How do people reason about sentences in natural language? Most experimentation on deduction has been carried out on hypothetical thought, in particular, examining how people reason about conditionals, e.g., if A then B.

Concept formation

Concept formation is the process of classifying information into meaningful categories (Ashby and Maddox, 2005). At its most basic, concept formation is based on experience with positive and negative instances. Concept formation is not as simple as it might seem. It can be and usually is confusing.

Types of concepts

There are three types of concepts, conjunctive concepts or 'and concepts', relational concepts and disjunctive concepts.

(i) **Conjunctive concepts:** It can be defined as the presence of two or more features (Reed, 2007). For example, a motorcycle must have two wheels and an engine and handlebars.

(ii) **Relational concepts:** They are based on how an object relates to something else, or how its features relate one another. All of the following are relational concepts: larger, above, left, north and upside down.

(iii) **Disjunctive concepts:** They have at least one of several possible features. These are 'either/or' concepts. To belong to the category, the item must have 'this feature, or that feature or another feature'. This 'either/or' quality of disjunctive concepts makes it hard to learn.

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General Intelligence Tests in Education

Intelligence is the ability to process information; find solutions to answers understand and appreciate social values, tradition, custom and norms. Verbal intelligence and non-verbal intelligence are the two main forms of intelligence. While verbal intelligence is the ability to understand and resolve language-based problems, non-verbal intelligence is the ability to comprehend and solve visual and spatial problems.

Tests are typically divided into verbal and performance tests. Verbal tests are those that require an understanding and knowledge of words. Language is used to test a subject's capacity to deduce relations and correlates through vocabulary analogies, classifications, number and letter series. Initially intelligence tests relied much more on such items. Such tests however come with many limitations; first and foremost they can only be administered on literates. Secondly, they are affected by the socio-economic class of the individuals taking the test and their language related experiences. David Wechsler was not very happy with the earlier tests that assessed intelligence, as he felt they relied heavily on language, hence in the intelligence scale designed by him, he focused on performance tasks substantially. A performance test is one in which the subject has to perform something or to manipulate some concrete material without much use of the language ability. There are some categories of people and children who cannot be tested with the help of verbal tests of intelligence. Performance tests are similar to non-verbal tests of intelligence.

Performance tests are useful for the following categories of children and people:

1. ***Hearing and speech impaired:*** Those children or people, who cannot hear or speak, can be tested with the help of performance tests. The directions can be given in Pantomime with a minimum use of language.
2. ***Illiterates:*** Illiterate adults and children who cannot write or whose language development is deficient may be tested with the help of performance tests of intelligence.
3. ***Shy and withdrawn children:*** Children who are shy or fear for face-to-face interaction with the tester may be tested.
4. ***Educationally deficient:*** Children, who are educationally deficient, take interest in concrete material and its manipulation can be tested.
5. ***Foreign children:*** Children of foreign countries who do not understand the language may be tested with performance tests.

Generally, performance tests are used to supplement other tests of intelligence. Performance tests provide more reliable data for an individual's capabilities. They are more useful in clinical work. These tests provide an opportunity for close observation of the behaviour of the person being tested in a test situation and his method of solving problems.

Some performance tests

1. **Healy-Fernald group of tests:** It was the first measuring tool to test the intelligence by performance.
2. **The Pintner-Paterson scale:** This performance scale is the first organized scale. This scale was standardized in 1917. It consists of Healy-Fernald performance tests and several other tests developed by earlier psychologists. The scale includes fifteen sub-tests. The tests are administered without the use of language either by the examiner or by examinee. The tests are useful for those who are hearing, and speech impaired and those who lack in language ability. They have been found very valuable supplement to verbal tests of intelligence.
3. **Form boards:** Form boards are used in several performance tests. The Ferguson form board was developed in 1920 and revised in 1939. It consists of six form boards, which increase in difficulty. These tests were standardized on children and college seniors who had some educational problems. They are currently used for children who come for clinical guidance.
4. **The Kent-Shaknow form board series:** This performance scale was developed in 1928. It is a widely used and known scale. It has two forms. One is for clinical use and the other for industrial. Basically, the scale was developed and standardized on clinical population. The scale provides an insight into the analytic-synthetic and manipulative skills of the subject. It also provides close observation of the behaviour of the subject and his mode of tackling a problem.
5. **The Goodenough drawing test:** This test was developed by Florence Goodenough in 1926. It is the most widely used test to measure the intelligence of children from 3½ to 13½ years. The child is asked to draw a picture of a man as best as he can, without any time limit. 'Draw a man' is a very popular test of intelligence. It requires no training and no specific material for administration. Several research workers have adopted it in Indian conditions.

   This test is a useful device as an adjunct to verbal tests when mental retardation in children is suspected.
6. **Bhatia battery of performance:** This was developed by C.M. Bhatia in 1955 and is known as a battery as it consists of a series of five performance tests. Each of these are time specific. The first one, that is, the Koh's Block Design test includes 10 out of the 17 from the original test. The subject has to reproduce designs on cards by using a set of cards. The next subtest, the Alexander Pass Along Test is taken from the original, whereas the third one has been designed by Bhatia himself. In this Pattern Drawing Test, the subject has to draw specified patterns without lifting the pencil. The fourth subtest, called the Immediate Memory Test, has two parts-the digit span forward and digit span backwards. The recall is continued till the subject successfully repeats the sequence. Finally, in the last subtest, known as the Picture Construction Test, the subject is required to combine parts to make a meaningful picture.

Advantages of performance tests

- Performance scales are most useful with older children and adults who are mentally challenged. They have clinical significance in case of older children.
- Since the performance tests do not require use of language, individuals do not 'block' as a result of feeling of inadequacy resulting from lack of schooling.
- Children proceed on performance tests with confidence, since the material is visually present in a concrete form. Performance tests provide an opportunity

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to observe the qualitative aspect of behaviour of the individual under standardized condition in a variety of test situations.

- Performance scales are useful and provide valuable information when supplemented with verbal tests of intelligence.
- They are useful for those with language handicap.

Weakness of performance tests

- Performance scales are more susceptible to practice effect and chance success is more frequent than in verbal tests. Hence, their reliability co-efficient is low.
- They are limited in range of mental functioning tested. They fail to differentiate among above-average children.
- The conventional performance scales fail to test fine mental abilities such as ability to make abstraction or concept formation.

Uses of intelligence tests

1. ***For measuring general learning readiness:*** We know that as intelligence tests are correlated with school achievement, intelligence tests can be used to indicate the level of capacity at which the pupil has arrived. Numerous investigations have been made to discover the relationship between intelligence tests and school marks at different levels of schooling. All researches have proved, beyond doubt, that intelligence tests can be used to measure the readiness for learning at different levels.
2. ***For indicating the extent of differences of IQ among the children of same chronological age:*** There are great differences in IQ of pupils of same age. These differences indicate the need for providing teaching materials at differing levels of difficulty. At various levels of education, we can use the tests for educational guidance, i.e., we can advise students to select subjects taking into consideration their intellectual abilities. IQ scores between 90 and 100 are labeled as 'normal', above 120 as 'superior' and below 70 is evidence of 'mentally challenged'.

IQ Score	*Descriptive label*
Above 140	Genius
130–139	Very Superior
120–130	Superior
110–119	Bright Normal
90–109	Average
80–89	Dull Normal
70–79	Borderline
Below 70	Mentally Challenged

3. ***Defining more accurately the degree of mental deficiency:*** Since the development of intelligence tests, we have been using intelligence tests to define more accurately the levels of mental deficiency. Intelligence test can aid us in knowing when children will probably need to go to special schools.

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The Stanford–Binet and the Wechsler Intelligence tests are the two most widely used IQ tests. Binet's Test is the best intelligence scale for predicting future academic achievement.

The Wechsler Scales are a group of intelligence tests which are more accurate at distinguishing between various types of intelligence.

4. ***For identifying gifted children:*** Since 1921, Terman used both individual and group tests of intelligence to identify the gifted children. Tests of intelligence have given us an accurate definition of brightness in terms of IQ. Teacher's judgment has been found inaccurate in identifying gifted children as reported by Terman, Whipple and Coy in their separate studies of gifted children.
5. ***For educational and vocational guidance:*** The essence of educational guidance resides in providing for all children materials for instruction, both in concerning the content and suitable to their level of intellectual development. When we contemplate the magnitude of individual differences, psychological testing can be very useful in ensuring that children's educational progress is in accord with their abilities and can be helpful in discovering those children who need vocational guidance. Vocational guidance means finding the right man for the job. Tests can be used to provide vocational guidance at different age levels in various vocations. At present in our country vocational guidance is not adequately provided. It is unfortunate that we have not yet developed a system of sound vocational guidance services. India needs to develop intelligence tests, interests and aptitude tests suiting to its needs. The guidance programme will have considerable social consequences in India, which is developing socially, economically and technologically. For making decisions about going to college, intelligence tests can be used to predict the subsequent success of high school or inter-college students. Teachers can use intelligence tests to make decision for individual students regarding their success in college or university.
6. ***For study of mental growth:*** Mental abilities develop in a sequential order from birth onward. We can use intelligence tests for studying mental growth and direction of individual and group curve. Intelligence tests have made it clear that the mental development of children is a steady consistent process from one year to the next. Use of intelligence test in consecutive measurement has thrown the old idea that there are periods of rapid mental growth at the time of adolescence followed by periods of slow growth. Mental growth continues until at least 18 years of age.
7. ***For homogeneous grouping:*** Teachers, in the past, have experienced great difficulties inherent in attempting to teach pupils or students who are widely different in their capacities to learn. In average classroom, bright and dull children are the losers. As remedy to the problems of traditional classroom, homogeneous grouping of students has been suggested and tried out in many schools of western countries with encouraging results with the help of intelligence tests.
8. ***Use in research*:** Intelligence tests are used for conducting research in different areas of human abilities.

Limitations of intelligence tests

We know that in India, very few tests have been developed or standardized. Generally, we use tests developed in foreign countries. An intelligence test permits a person to show what he can do at a certain time with a certain carefully selected, but small, set taken from all the possible items, which test intelligence. No one should suppose that this small set can tell as much about him as if 100 times as many items were available. Nonetheless, it tells a great deal and inordinate increase in length of tests, suffer the usual consequences of the law of diminishing return. Similarly, we know that one person may be more fatigued than another when we take the test, possibly reducing his scores. They tell us what a person can do right now, handicapped or favoured as he may be by his inherited characteristics, his home and school background, better sensor motor or bodily states. They do not tell us how he would have done if tested ten years ago or if tested ten years hence, with or without ideal conditions during those ten years. Consequently, it is always possible to second-guess such a test and conclude that it does not tell what we really want to know.

Jensen reports that he has often had cause to believe that the first intelligence tests given to certain children underestimate their IQ after 2 to 4 days of being acquainted with such children. He typically found that a retest on a different form of the same test yielded an IQ of 8 to 10 points higher. Children may be so frightened in a testing situation with a tester they are unfamiliar with and when confronted with tasks that are completely novel that they do not exhibit nearly the intellectual capacity one would expect from other evidence about them. Particularly with young children, it would be important to spend much more time-building rapport for testing than few minutes that are sometime employed before formal testing begins. One of the major defects of present-day testing is that, it is unable to get below the surface of the mind. It measures what a child knows rather than how far he can go in the pursuit and discovery of ideas. It has almost no bearing on originality, on the mobilization of many ideas toward a single concept or on the ability to devote his attention over a period of time to a single line of thought. A smattering of knowledge in many fields will lead to a score equal to that of the child who could do marvelously well along certain lines, but whose accredited performance is cut off far below his mental levels. For example, a child with a 30,000 words vocabulary can scarcely get more mental credit than a child with 10,000 words vocabulary, although the differences in mental accomplishment are tremendous.

Some misconceptions regarding use of intelligence tests in education

The following are the misconceptions regarding the use of intelligence tests in education:

1. The first misconception is the notion that intelligence tests measure something called 'native ability', something fixed and immutable within the individual that determines his level of expectation for all time. No doubt, genetic studies of identical twins reared separately under different conditions have proved that an individual inherits intellectual abilities, but intelligence tests do not measure such an entity, at least not directly. Intelligence tests measure the individual's performance on certain type of mental tasks. The types of mental tasks included in intelligence tests are influenced by experiences in school and home. The experiences depend on many factors as the education of parents, availability of books in home, socio-economic condition and a variety of experiences the child gets in his surroundings. Thus, the notion that intelligence tests measure inherent ability is absurd.
2. The second misconception about intelligence tests is the notion that prediction made from test scores is or should be perfectly accurate.
3. The third misconception is that standardized test scores are perfectly reliable.
4. The fourth misconception regarding intelligence tests is that a battery of tests can tell all one needs to know in making a judgment about a student's competence, present and potential, and about his effectiveness as a human being. The fact is otherwise that no test or battery of tests can give a total picture of a child. No doubt, tests can illuminate many areas of a child's development. They can suggest something about his strengths and weaknesses.

They can show in certain respects, how he stands among his peers. However, there are many areas of learning where we must still rely upon the observation and judgment of teachers if we want to get a complete description of a child as functioning individual. Any evaluation of a child that depends solely on mental test scores is bound to be misleading and incomplete. There are subtle and supremely important human elements in the teaching-learning situation that no combination of tests yet devised are able to capture.

As it has been expressed earlier researchers, theorists and scientists have not been able to define intelligence in one way. There are many synonyms to describe its functions. Some of the widely recognized terms that define intelligence are: IQ or intelligence quotient, aptitude, cognitive ability, thinking skills and mental ability. Intelligence testing is the test engineered to determine the level of intelligence. In other words it is an estimation of an individual's propensity to gauge the mental ability or capacity through performance in various tasks. These tests are structured to test different types of reasoning.

Types of intelligence tests

Intelligence tests are conducted in several different ways:

- **Group intelligence tests:** mainly consist of a test booklet along with a scoring sheet.
- **Individual intelligence tests:** mainly comprise different types of assignments complete with question-answer sessions and word games. Most tasks under this category are timed.
- **Computerized tests:** are rapidly gaining popularity. However, researchers must bear in mind the requirement of the child before administering a particular intelligence test.

7.3 PERSONALITY AND CREATIVITY

According to G.W. Allport, 'Personality is the dynamic organization within individual of those psycho-physical systems that determine his unique adjustment to his environment.' Eysenck defined personality as 'the more or less stable and enduring

Check Your Progress

7. Name the items contained in the verbal test.
8. What is intelligence testing?
9. Name the different ways in which intelligence tests are conducted.

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organization of a person's character, temperament, intellect and physique, which determine his unique adjustment to the environment'. According to Watson, 'Personality is the sum of activities that can be discovered by actual observations over a long period of time to give reliable information.' For Morton Prince, personality is 'The sum total of all the biological innate dispositions, impulses, tendencies, appetites and instincts of the individual and the dispositions and tendencies acquired by experience'.

7.3.1 Personality

In a nutshell, personality refers to the external appearance and internal qualities of an individual. It is something unique to everyone, and it is the result of the interaction of heredity and environment. Personality refers to individual's unique and relatively stable patterns of behaviour, thoughts and feelings. We cannot draw a watertight compartment between personality and all the psychological traits. Personality is a summative approach which assesses all the integrative qualities of an individual. Learning and acquisition of experiences in every platform of life contribute towards growth and development of personality.

Characteristics

The characteristics of personality are as follows:

- Personality is built by heredity and environment
- There is individual difference in personality
- Personality determines one's adjustment to his environment
- Personality emerges from the interaction of psycho-biological organism
- Personality may be intrinsic or extrinsic
- Personality is the reflection of all the psychological and physical traits of an individual
- Personality can be assessed
- Personality means man within the man
- Personality refers to social adaptability
- Personality is a dynamic organization
- Behaviour is the reflection of personality
- Personality permits a prediction about an individual
- Personality is more or less stable in nature
- Personality exhibits self consciousness
- Personality includes all the behaviour patterns: conative, cognitive and affective
- Personality includes conscious, semi-conscious and unconscious activities
- Learning and acquisition of experiences contribute towards growth and development of personality
- Personality should not be taken as synonymous with one's character and temperament
- Personality of an individual is directed towards some specific ends

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Determinants

An individual is the by-product of his heredity and environment. Many believe that heredity plays a major role towards personality development, but in reality, no one factor can be given credit of influencing personality. Personality is the by-product of many factors which are discussed below.

(i) **Heredity:** In most of the cases, children are more similar to their parents and siblings. Heredity influences physique, motor-sensory equipment and level of intelligence. Physical appearance of an individual contributes a lot for his personality. So, heredity does play an important role in the development of personality.

(ii) **Environment:** Here, we will discuss about three types of environment: (a) Physical environment, (b) Social environment, and (c) Cultural environment. These factors make an individual to 'acquire' a personality.

(*a*) *Physical environment:* Physical environment refers to the physical, geographical and geological structure of the area where an individual lives. In case of the cold countries, people are white; but in hot countries, people's complexion is black. The people of North East of India are different from the people of South India in their colour and physical appearance. This difference is mostly due to the physical environment.

(*b*) *Social environment:* Social environment of an individual includes all social agents like parents, siblings, peer groups, school, teachers, neighbours, etc. All these factors play their role in the development of personality of an individual. Children from homes where morality, honesty, spiritualism, religiousness are given importance, are different from the children from the homes of poverty, family disorder, formal relationship among all etc. A child's maximum time is devoted in school with his teachers and friends. Teachers are the role models before the children. The principle of discipline, living cooperatively, respect to teachers, feeling brotherhood and sisterhood in uniform dress, all these are acquired by schools. Teacher's open mindedness, democratic look, enthusiastic and industriousness, leave a mark upon a child which develops his personality. Interpersonal relationship among the members of a society are important means which help in the development of certain social personality characteristics. All these factors help in the development of personality.

(*c*) *Cultural environment:* Cultural values moulds the personality of people belonging to that culture. A child internalizes the values, ideas, beliefs, norms and customs of a culture through the interaction with this culture and the society. Every society has its own cultural heritage, and this cultural heritage transmits from generation to generation successfully which is known as 'enculturation'. The personality of the people of Eastern society is different from the personality of the people of Western society, it is due to the cultural change. Margaret Mead conducted a study on the adolescents of Somoa, a primitive culture. She concluded that the cultural pattern of a society influence to a great extent the personalities of individuals.

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Assessment

The concept of personality is a subjective concept. It is very difficult to assess or measure subjective concepts objectively. Still, psychologists have tried to measure personality of human beings through different tools and techniques. In the primitive society, physical strength was the norm of personality measurement; during the *Vedic* period, the memorization of the *Vedas* was the norms of personality measurement. Later, astrology, palmistry, physiognomy and phrenology were considered as the measures of personality.

The methods used for assessment of personality may be categorized as subjective, objective and projective techniques. It is very difficult to bring a watertight compartment among all these assessment techniques. Some of the important techniques are discussed here (some have already been discussed in Unit 5).

(i) Observation: Through observation in real-life situation, the personality of an individual can be known. Observation is of two types: (a) participant observation, and (b) non-participant observation. In case of participant observation, the observer becomes a part of the group or becomes a part of the life of the individual whose behaviour is observed. But in case of non-participant observation, the observer remains away from the group or from the individual. Observation is a first-hand information, so it is more valid and reliable. But sometimes the observer's biasness affects the assessment. Some people also hesitate to reflect their natural behaviour when they know that somebody is observing them. Behaviour is a subjective concept, and it varies from situation to situation. But, observation has a great role in assessing personality.

(ii) Interview: Interview is a technique of eliciting response from an interviewee by a couple of interviewers. In the words of Maccoby and Maccoby, 'interview refers to a face-to-face verbal interchange in which the interviewers attempt to elicit information or expression of opinion or belief from the interviewees'. Within a limited period of time, the interviewers ask questions to the interviewees and elicit responses from them. Interview may be of two types: (a) structured interview and (b) unstructured interview. In structured interview, some questions are pre-fixed to be asked. The type of behaviour to be assessed is also pre-planned. But in unstructured interview, the questions are situational. Open interrogation takes place between the interviewers and interviewees. The scope of unstructured interview is more than structured interview because in the former case the interviewers are not restricted to a particular set of predetermined questions. Interview techniques have their own limitations as well. Skilled interviewers are necessary and this technique is time consuming. It also suffers from the personal biasness of the interviewers.

(iii) Checklist: A checklist consists of some items and the subject is supposed to respond to the items according to his interest. From the responds, the personality of the subject is assessed by the psychologists. For example, in the list given below, the subject is asked to check the items which are applicable to him.

Example,

- I want to work whole day.
- I want to lead a comfortable life.

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- I want rest whole day.
- I want to pray whole day.

Examples of standardized checklists are: (a) Money problems checklist, and (b) Student problem checklist made by Central Bureau of Educational and Vocational Guidance.

(iv) Rating scale: Rating scale was developed by Galton in 1883. According to Van Dalen, 'a rating scale ascertains the degree, intensity or frequency of a variable'. In the words of Good and Scate, 'the rating scale typically directs attention to different parts or aspects of the thing to be evaluated, doesn't have as many items or categories as the checklist or score card'. Through this device, a rater can record judgments of another person or his own based on the traits defined by the scale. It covers much wider range of natural behaviour than any practicable battery of personality tests. There are different types of rating scales like: (a) Numerical scale, (b) Graphic scale, (c) Cumulative points scale, (d) Standard scale, and (e) Forced-choice rating.

(v) Personality inventory: The tool was developed by Wood Worth in 1919. But at that time, it was known as 'personal data sheets'. In personality inventory, an effort is made to estimate the presence and strength of each specified trait through a number of items representing a variety of situations in which the individuals' generalized mode of responding may be sampled. Personality inventory is of two types: (a) uni-dimensional personality inventory, and (b) multi-dimensional personality inventory.

Personality is of multi-dimensional quality. That is why the multi-dimensional personality inventory used in most of the cases. The reliability of personality inventories ranges from very low to satisfactory coefficient 0.8, depending on the traits being measured. Personality inventories are particularly useful in group trends i.e., in differentiating between groups of adjusted and maladjusted, rather than among individuals.

Minnesota Multiphasic Personality Inventory (MMPI) is mostly used in assessment of personality. It was developed in 1940 its first manual was used in 1943. It is available in individual card form and group booklet form. It consists of total 550 items and is used on the individuals above the age of 16. MMPI consists of three answers: True, False and Can't say; and it is mainly used in clinical and diagnostic centres. The time required for administration of MMPI is 90 minutes and its reliability ranges from 0.50 to 0.90.

(vi) Projective techniques: The term 'project' was used for the first time by Sigmund Freud in the field of psychology. Projection, according to Freud, means externalizing of conflicts or other internal conditions that give rise to conscious pain and anxiety. 'Projection' refers to encourage an individual to use his imagination as per his interest. Projective techniques are those which draw out responses from the unconscious. It enables an individual to reflect his internal feelings like aptitudes, attitudes, values, philosophies etc. All the projective techniques are dealt with complex mental processes which reflect the whole personality of an individual.

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The characteristics of projective techniques are as follows:

- Unstructured and ambiguous materials are used in projective techniques
- It studies the unconscious mind of individuals
- It studies the total personality of individuals
- It evokes multi-dimensionality of responses
- There is freedom to respond on the part of the respondents, when responding the techniques
- The answers to projective techniques are not right or wrong
- The purpose of projective techniques are disguised
- The validity and reliability of projective techniques are more
- Projective techniques have holistic approach in assessing personality
- These techniques are especially useful for children

Projective techniques also suffer from certain limitations, which are as follows:

- Projective techniques are subjective
- Experts are required for use of these techniques
- It is difficult to construct, administer and evaluate projective techniques
- It lacks objectivity in evaluation
- It lacks norms
- Interpretation of the test is time consuming
- It is very difficult to measure its validity and reliability
- In most of the cases, directions for the administration of the projective techniques are not standardized
- The evaluation of projective techniques varies from evaluator to evaluator

Some of the projective techniques are explained below.

(*a*) ***Thematic apperception test (TAT):*** This technique was developed by Morgan and Murray in 1935. Thematic Apperception Test is called story-telling test because the respondents are to tell stories according to the pictures shown to them. TAT pictures are administered individually as well as collectively to group of individuals. The test material consists of 31 cards, 30 reflecting various pictures and one blank card. All the pictures are related to real-life situations through which an individual passes. All the pictures are given in two sessions and the number of pictures depends upon age, sex and aspect of personality to be assessed. After the administration of the test, the examinees are interviewed, and asked why they wrote such type of stories. The interpretation of the stories takes place with the help of these following points:

- The hero
- Theme of the story
- The end of the story
- Punishment for crime
- Defence and confidence
- Emotional expressions etc.

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(*b*) ***Rorschach inkblot test:*** This technique was developed by Swiss psychiatrist Herman Rorschach in 1921. The test consists of 10 symmetrical inkblots on 10 separate cards of 11 × 9 inches.

Five of the inkblots are black and white, and others are multicoloured.

All the inkblots are completely unstructured. All the cards are given to the respondent at a time in a sequence. Here, the subject is given more time and is permitted to give as many responses as he likes. After this, the examiners generally conduct inquiry into the details of the subject's response on individual cards. For the scoring purpose, the responses are given specific symbols and entry is made into four columns: location, contents, originality and determinants.

The reliability of Rorschach inkblot test is 0.75, and the validity ranges from 0.5 to 0.8. The test requires trained and skillful persons for scoring and interpreting it, and, therefore, the work must be done only by experienced and trained psychologists.

Projective techniques

Psychologically, projection is an unconscious process, whereby an individual attributes certain thoughts, attitudes, emotions or characteristics to other persons or objects in the environment. He expresses his needs to others in an environment and draws incorrect inferences from an experience. Projective technique provides the subject with a semi-structured or unstructured stimulus situation giving him an opportunity to impose upon it his own private needs and his own perceptions and interpretations. Projective techniques require the subject to describe or interpret objects other than him, and these are based on the hypothesis that an individual's response to an unstructured stimulus is influenced by his needs, motives, fears, expectations and concerns. Interpretations are drawn on the basis of the completeness provided by the testee, and the type of stimulus presented to him.

The several forms of projective technique are pictures, inkblots, incomplete sentences, word associations, one's own writings and drawings etc., which are intended to elicit responses that will reveal the respondent's personality structure (feelings, values, motives, characteristics, modes of adjustment and complexes). He is said to project the inner aspects of his personality through his interpretations; and creations his needs, wants, desires, aversions, fears and anxieties get reflected involuntarily.

Projective techniques are the means to dig out the intricacies of human behaviour which are below the surface and are incapable of exposure by subjective and objective techniques such as observation, peer ratings and self-rating questionnaires etc.

Most commonly known projective techniques are the Rorschach Inkblot Test and Thematic Apperception Test (TAT). Rorschach Inkblot Test provides an insight into the nature of disorder on the one hand, and hidden feelings, emotions and desires on the other, which the testee would not have normally desired to be known to others. It consists of a set of 10 inkblots: five made in shades of black and grey only, two contain bright patches of red in addition to shades of grey, and the remaining three employ various colours. In this, the subject is shown one blot at a time and is asked what he sees in it.

Thematic Apperception Test (TAT) consists of the pictures of people in various settings. It has a set of 30 cards and one blank card which are used in various

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combinations as per the age and sex of the subject. In TAT, the subject is told to make up a story about each picture in turn. In actual clinical practice, a set of 10 selected cards is used for the particular case. TAT is helpful in identifying the presence or absence, as well as strength, of one or more motives to be used for diagnosing the problems. Other techniques include Children Apperception Test (CAT), Draw-a-Man Test, Word Association Test, etc. Artistic products of structured type or completely unstructured, like finger paintings, can also be used as projective techniques.

One of the major advantages of projective techniques is that they are not difficult to administer. These can be used for persons of all ages, ethnic groups and intelligence levels. Projective techniques are ingenious efforts to measure personality variables. They are said to measure the 'whole personality'. The projective techniques are, however, difficult to interpret for which sustained training is necessary. Despite their widespread use by clinical and school psychologists, projective techniques are relatively un-standardized ordinary measure of reliability that are difficult to obtain. Yet their popularity may be attributed to 'faith validity' and the mistakes assumed by the users.

Where to use projective technique?

As clarified earlier, the projective techniques are useful in bringing out covert behaviour patterns, though indirectly, which are either not revealed through the use of subjective and objective techniques, or are concerned with very deep rooted motives and emotions which the respondent would not like to be exposed to. Children and adults unwilling to discuss their problem may be administered projective techniques. Some of the situations most appropriate for the use of projective techniques are as follows:

- Identifying the subject's real concerns, his conception of himself, and the way he views his human environment
- Diagnosing the behavioural problems of students
- Studying the personality of children who are unable or unwilling to discuss their problems directly
- Verification of the patterns of personality emerging out of subjective or objective techniques
- Studying the home and school adjustment of adolescent
- Studying personality or adjustment patterns of more sensitive subjects, or of those who tend to give biased responses on tests
- Clinical usages
- Testing illiterate persons of different language backgrounds

Use of projective techniques by teachers

Projective techniques by their very nature require properly trained personnel to administer and interpret them. It is necessary to be aware of projective techniques and to be able assess if there is any utility in employing them to study various kinds of personality disorders and maladjustments among students. Teachers should not casually venture into using projective techniques unless they are properly trained for them. These techniques should be used only by clinical psychologists or school psychologists who have had intensive training in the use of these methods. In view of the complexity associated with the application of projective techniques, these should be employed in

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case of students showing the signs of very severe emotional problems. It should be noted that projective techniques are most successfully used for eliciting suppressed desires, feelings, ambitions, attitudes and emotions, guilt and complexes etc.

Limitations of personality assessment

The demerits of personality assessment are as follows:

- Personality is a subjective and relative concept, so it is very difficult to assess it
- Personality assessment cannot be purely objective
- Sometimes, the result of personality assessment affects the individuals
- Sometimes, the result of personality assessment is different from the real-life situation
- Personality assessment varies from technique to technique
- Personality assessment varies from evaluator to evaluator

7.3.2 Creativity

A number of experts have attempted to define 'creativity' and 'creative process' in various ways. According to Stagner and Karwoski, 'creativity implies the production of a 'totally or partially' novel identity'. Drevdahl stated that creativity is 'the capacity of a person to produce compositions, products or ideas which are essentially new or novel and previously unknown to the producer'.

According to Spearman, 'creativity is the power of the human mind to create new contents by transforming relations and thereby generating new correlates'. Over the years, there has been much disagreement among scholars as far as the concept and true nature of creativity is concerned, because creativity is a process as well as a final product. While some scholars count it to be purely a component of the cognitive mind, some like Ausuble consider it a quality of a person, and a function of his overall personality. Stein believes that creativity cannot just be an abstract concept or something that satisfies the personal intelligence, but should also be useful from the social and cultural perspectives.

Creativity may be described as the capacity or ability of an individual to build, find out, or create a new or novel idea or object, including the rearrangement or reshaping of something that is already known, and which turns out to be a distinctive personal experience.

Characteristics

When creativity is considered to be a unique and novel personal experience, various scholars consider it to have the following characteristics:

(i) **Creativity is universal:** Creativity cannot be the copyright of any one individual, community or organization and is not bound by age, background or culture. Each one of us is equally capable of creativity, although it may vary from individual to individual.

(ii) **Creativity may be inherent or acquired**: Even though it is generally believed that creativity is an innate talent and god-gifted, certain experiences, learning

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and experiences can also contribute to a person's creativity. Therefore, creativity can be said to be a function of nature as well as nurturing.

(iii) **Creativity produces something new**: Creativity implies the capacity of a person to produce something new and it does not have to be a totally new idea or product. It may also be a fresh, never-seen-before combination of old ideas or a unique restructuring of already known facts and principles. It may also include a new way to apply an old technique. However, the only criterion for it to be qualified as creativity is that it should not be a reproduction or repetition of what already exists or has been experienced by someone else.

(iv) **Creativity is adventurous and open thinking**: Creativity represents the act of moving away from the stereotypical and rigid way of thinking. It inherently requires freedom of thought and expression, exploration of new ideas and choosing new ways to function. It is kind of like an adventure which leads a person down new, uncharted paths and results in a thrill of victory, if successfully implemented.

(v) **Creativity is a means as well as end in itself**: Creativity is an urge within an individual to do something new and unique and does not necessarily satisfy the material urge for profit. It is the drive to express one's understanding of the world and therefore offers great joy to the creator. When the creator creates something new, the process is the most rewarding and joyful experience of all and cannot be replicated or explained to others. It may even be more rewarding than the end product because with the end product being built, the process comes to its logical end.

(vi) **Creativity involves the ego**: The creator is completely involved in his creation since it's a personal expression for the creator. The creator's identity and personality are reflected in the creation— whether it is a work of art, or a piece of writing, etc. The creator is proud of his creation and likes to make statements like, 'It is my creation', 'I have solved this problem', 'It is my idea', etc., which reflect ego involvement of the creator.

(vii) **Creativity and intelligence are not always interdependent**: Research has shown that creativity does not depend upon intelligence or vice versa. In other words, one does not automatically lead to the other. It has been observed that individuals coring very high on IQ tests may show zero creativity whereas individuals who do not score so well may come up with an astoundingly original idea. However, while an intelligent person may not be necessarily creative, a certain level of intelligence is necessary in order to be creative, if only to be able to express one's idea correctly. If this were not true, we would have seen people of low mental ability to be creative, but this is usually not the case. On the other hand, while creative people would usually be intelligent otherwise too; beyond a point, a higher IQ does not necessarily mean that the person is creative.

(viii) **Creativity emerges from divergent thinking**: Divergent thinking refers to scanning the problem or puzzle from a broad outlook, thus allowing an individual to look at it from multiple perspectives. This kind of thinking serves well when a person is faced with a problem that can be solved in many different ways. It is usually seen to be applied by creative people rather than conservative thinkers.

This is the reason that when creativity tests are designed, a common article of use is offered to the participant who is required to come up with as many non-ordinary uses for that article as possible. The more divergent an answer, the more the participant scores, unlike the usual tests where there is only one correct answer and the respondent has to come up with that particular answer only to be able to score.

(ix) **Creativity cannot be separated from intelligence:** In spite of the fact that intelligence or creativity may function independently, and that creativity involves more of divergent thinking as opposed to the convergent thinking employed in the demonstration of intelligence; it is not possible to entirely separate creativity from intelligence. This is because thinking is neither purely divergent nor purely convergent and always has elements of both, simultaneously involved in the creative and the intellectual process. It, therefore, follows that when a person is considered to be creative; he has to have a minimum level of intelligence.

(x) **Creativity and school achievement are not correlated:**No significant correlation has been observed between an individual's creative talent and his school performance, one may be creative but score quite low on achievement tests; and similarly, a topper in school or in the Board examination may show little or no creative output. The reason being that in the usual achievement testing, assessment is done in terms of the quality of reproduction of the informational input while the creativity testing requires greater output than the input in terms of formal as well as informal teaching.

(xi) **Sociability and creativity are negatively correlated:** Creativity requires individual to be more sensitive to the demands of a problem than the evaluation of his social environment. The creative individual is more inner-orientated than outer-orientated. He likes to utilize his energy and potential more for the satisfaction of his creative urge rather than to care for the peer group's approval. It is for this reason that the creative individuals are usually not very sociable.

(xii) **Creativity and anxiety often go together:** It has been noted that creative people demonstrate an above average state of anxiety. However, the anxiety of the creative individual is quite different from that of the neurotic individual with a disturbed personality. The high anxiety of the creative individual may be the result of his craving for the satisfaction of his creative urge and discontent with his status or rate of progress in attaining his creative motive. But creative individuals are quite capable of keeping their anxiety within manageable limits and directing it into productive channels.

Investigating creativity

Creativity, as Rock, Evans and Klein (1969) put it, may be satisfactorily investigated by adopting the following three basic approaches, (i) creativity as a process, (ii) creativity as a product, and (iii) creativity as an attribute of one's personality.

(i) Creative process

Many psychologists and scholars have studied the creative process in an effort to understand it. Let us summarize some of their findings.

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Wallas (1926) described the creative process as consisting of four stages: (a) preparation, (b) incubation, (c) inspiration or illumination, and (d) verification or revision.

In the first stage—preparation—the conscious work on the problem is initiated and continued as long as possible. Initially, the problem is defined or analysed and the stage is set for its solution. The facts and material relevant to the solution are then collected and examined, and the plan of action is formulated. Then, we start working on the set plan. In between, if essential, the plan of action is modified; we switch over to another method or take the help of other relevant data if those in hands fail to help us. In this way, a continuous and persistent effort is made. In case, it appears at some point that we cannot solve the problem, frustration leads us to set the problem aside for the time being.

This kind of deliberate or voluntary turning away from the problem is the beginning of the second stage, i.e., incubation. This stage is characterized by the absence of activity, or in many instance, even of thinking about the problem. We may rest, sleep or engage in other interesting activities. If this is done, ideas which were interfering with the solution of the problem tend to fade. In the absence of such interference, our unconscious begins to work towards finding a solution of the problem sometimes, the things we experience or learn in the meantime, may provide a clue to the solution (Archimedes found the solution of his problem when he was in his bath tub).

The stage of inspiration or illumination follows. During this stage, the thinker is often presented with a sudden appearance of the solution of his problem. Such illumination may occur at any time, sometimes even while the thinker is dreaming.

The final stage—verification or revision—comes next. During this stage, the illumination or inspiration is checked out to determine whether the solution or idea which appeared through insight is, in fact, the correct one. In case it does not work out, fresh attempts are made to solve the problem. Sometimes, the earlier solution needs slight modification or change to become workable. The creative thinker does not, at any stage, accept a solution as perfect and holds it open to modification or revision in line with subsequent findings.

Rosman (1933) has mentioned the following stages in the creative process:

- Observation of a need or difficulty
- Analysis of the need
- Survey of all the available information
- Formulation of all the objective solutions
- Critical analysis of these solutions
- Birth of a new idea—the invention
- Experimentation to test the most promising solution, and selection and perfection of the final embodiment by some or all of the previous steps

Torrance and Myers (1970) have defined the creative process as consisting of the following stages:

- Becoming sensitive to or aware of problems
- Bringing together viable information
- Searching for solutions
- Communication of the results

Stein (1974) has attributed the following stages to the creative process:

- Preparation or education
- Hypothesis formation
- Hypothesis testing
- Communication of the results

However, the stages mentioned by each of the different scholars should not be considered to be rigid and fixed stages followed every time by every creative thinker. One person may arrive at the solution of the problem before experiencing all the previous stages. Another person, on the other hand, may not find the solution even after passing through all stages of the creative process, and may need to repeat the cycle several times before producing anything creative or arriving at an acceptable solution of the problem.

(ii) Creative product

Creativity is investigated, understood and identified through the outcome of the process of relation or the creative products. How creative one is, can thus be determined through one's output in the form of ideas, works of art, scientific theories, or even building designs. However, for a product to qualify as creative, certain minimum criteria must be met. Telford and Sawrey (1977) and Mackinnon (1978) have proposed originality or novelty and relevance or appropriateness as the two main criteria for judging a creative product.

However, according to these authors, originality or novelty of a product should not be judged independent of the second criterion of relevance or appropriateness. To be relative, a so-called original or novel creation must fit or be useful within its relevant context. It must demonstrate proper relevance to a problem, situation or goal including the purposes of its creator.

In addition to these necessary and essential conditions, a creative product must also fulfill the following conditions:

(a) It must be aesthetically pleasing, and give joy and satisfaction to the producer as well as the user.

(b) It should provide new perspectives in some areas of human experience, and create new conditions of human existence.

(iii) Creative attribute

Not all individuals are creative. One needs to distinguish between different personality types to differentiate between the creative and the non-creative. Various researchers have done their research on different personality traits and on the qualities that sets the creative person apart from the non-creative. Some of such researchers of behavioural studies include: Cattell (1968), Torrance (1962), MacKinnon (1962) and Foster (1971). The most common personality traits of a creative person include:

- Originality of ideas and expression
- Adventurous persona

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- Good memorizing power and a sense of enthusiasm and awareness
- The spirit to dive into the unknown
- Foresight
- Team maker and decision maker
- Interest in vague, even silly ideas
- A high degree of sensitivity towards problems
- Eloquent and versatile
- Flexible and accommodating
- Ability to use the acquired knowledge to implement plans
- Creative bent of mind
- Diversity of thought and action and the ability to come out of stereotype situations
- Ability to work out the details of an idea or a plan
- Enthusiasm for taking the initiative to solve problems
- Confidence to take up and complete the assigned task
- Calm and relaxed outlook
- High aesthetic values
- Self-respect, self-discipline and a keen sense of justice
- Ebullient and easy nature with a relaxed attitude
- Awareness of obligations and responsibilities
- Ability to accept tentativeness and to tolerate and integrate the opposites
- Patterns of thought different from those of the less creative, particularly during creative activity
- Spontaneity and ease of expression
- The capacity to fantasize and daydream

Identification of creative potential

Although every one of us in endowed with some aspects of creativity, its distribution is neither equal nor universal and some individuals have greater creative potential than others. How can such high creative talent be recognized? Researches in this regard have established that creativity is not necessarily accompanied by a high level of intelligence. Guilford (1959) has clearly made the distinction by proposing the concept of convergent and divergent thinking, the latter being closely associated with crate thinking. Similarly, Getzels and Jackson (1962) have successfully argued that creativity was far more independent of IQ, especially at the upper levels. Therefore, a genius or a gifted person may not have a very high IQ as creativity in its many shapes and forms is an expression of giftedness, and not of a high degree of intelligence. How can the creative individuals be then identified?

Behaviour as we know is expressed through its conative, cognitive and affective components, and creative behaviour is no exception. Consequently, an individual is creative to the extent to which he can demonstrate creative potential in his thinking, actions and feelings. For a total assessment of creative behaviour, we have to apply a

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multi-dimensional approach involving the use of the available creative tests and the multiple non-testing devices like observation, interview, rating scale, personality, inventory, situational test, interest inventories, attitude scales, aptitude tests, value schedules and projective techniques etc. The characteristics and personality traits of a person may provide reliable indications for the identification of creative potential which may be further verified by comparing the performance with standardized creativity tests.

Creativity tests

Creativity tests may be used in the identification of the creative in the same way as intelligence test is used for the assessment of intelligence. There are many standardized tests available for this purpose.

The tests standardized abroad:

- Minnesota tests of creative thinking
- Guilford's divergent thinking instruments
- Remote association tests
- Wallach and Kogan creativity instruments
- A.C. test of creative ability
- Torrance tests of creative thinking

The tests standardized in India:

- Baqer Mehdi's tests of creative thinking (Hindi/English)
- Passi's tests of creativity
- Sharma's divergent production abilities test
- Saxena's tests of creativity

Creativity is a complex blend of a number of abilities and traits, and hence all the creative tests mentioned above attempt to measure several dimensions of one's creative behaviour through their test items, verbal and non-verbal. The factors or dimensions of creativity commonly measured through these tests are: (a) fluency, (b) flexibility, (c) originality, (d) unusual responses, (e) resistance to premature closure, and (f) elaboration, etc.

Let us now try to illustrate components and functioning of the creative tests with the help of two creative tests, one developed abroad and the other in India.

(i) Torrance tests of creative thinking

Creativity tests developed by E. Paul Torrance, the eminent American psychologist, cover both verbal and non-verbal activities performed by the subjects; and is claimed to be successfully used from kindergarten to graduate schools. For testing the non-verbal performance, Torrance developed Torrance Test of Creative Thinking (figural forms A and B); and for the verbal performance, the Torrance Test of Creative Thinking (verbal forms A and B). Form B are the equivalent alternative of the Form A in these tests.

The figural forms (employed as a non-verbal testing device) make use of tasks that require drawing and pasting. The activities required in the non-verbal sub-tests are of the following nature:

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- *Figure of picture completion test:* In this sub-test, there are some incomplete figures (as shown in Figure 7.1). The subject is asked to complete these figures by adding new dimensions or lines for providing new ideas. He is also asked to give suitable titles for the completed figures or pictures.
- *Picture or figural construction test:* In this sub-test, the subject is provided with a piece of coloured paper cut in a curved shape, and is asked to think of a figure or picture of which this piece of paper may be a part. He is allowed to add new ideas to make this figure as interesting and meaningful as possible. He is also asked to provide a suitable title for this figure or picture.
- *Parallel lines test:* In this sub-test, there are several pairs of straight lines. The subject is required to draw as many objects or pictures by using each pair. He is also asked to provide a title for each of his drawings.

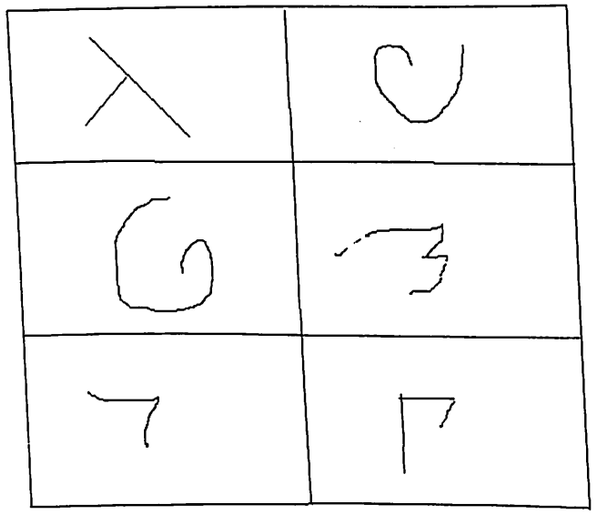


Fig. 7.1 Sample Items from Torrance Tests of Creative Thinking (Figural Form)

The verbal forms (employed as a verbal testing device) incorporate tasks which require the use of language. The subject is required to provide written responses to the questions put to him. The verbal activities asked to be performed are of the following nature:

- *Asking type:* In asking type of activities, the subject is encouraged to reveal his ability to perceive all things which are not normally perceived by others. The help of some pictures may be taken for this purpose. In these activities, the subject may also be asked questions that would enable him to fill in the gaps in his knowledge.
- *Guess causes and guess consequences type:* Both these guessing type activities are aimed at revealing the subject's ability to formulate hypotheses concerning cause and effect. While being presented with a picture, the subject may be asked to guess what lies behind the situation in the picture and what its consequences may be.
- *Product-improvement type:* In these activities, the subject is asked to suggest ways and means of improving a toy, a machine or some other such product to make it as interesting and useful as possible.

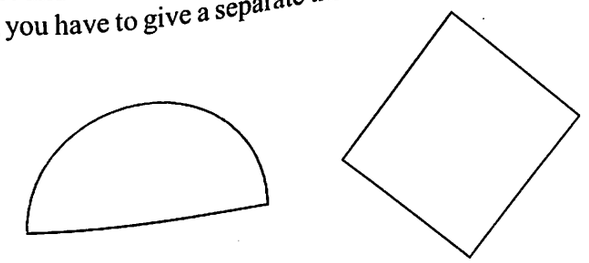
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- *Unusual uses type:* These devices are meant to test the subject's divergent thinking about the number of ways in which a product may be used. Here the subject has to enumerate as many unusual uses as he can think of, for instance, in how many unusual ways can knife or brick be used?
- *Unusual questions type:* In these activities, the subject is required to ask as many unusual questions as he can about a picture, scene or verbal description.
- *Just suppose type:* In these activities, the subject is required to predict the outcomes of the creative abilities such as originality, fluency, flexibility and elaboration, etc. An overall high score on the various sub-tests of the Torrance Creative Test gives the tester an idea of the overall creative potential of his subject. However, for a more reliable and valid appraisal of creative potential, one has to take recourse to other non-testing devices and personality assessment measures.

(ii) Baqer Mehdi's verbal and non-verbal tests of creativity

This test, developed by Baqer Mehdi, consists of four verbal and three non-verbal sub-tests. The verbal and non-verbal forms are also available separately.

- *Consequence test* (Time allowed 12 minutes): Think for the following situations as many consequences as possible:
  1. What would happen if man could fly like the birds?
  2. What would happen if our schools had wheels?
  3. What would happen if man did not have any need for food?
- *Unusual uses test* (Time allowed 15 minutes): Write as many novel, interesting and unusual uses for the objects as you can think of, viz., a piece of stone, a wooden stick, water.
- *New relationship test* (Time allowed 15 minutes): Think of as many relationships between the following pairs of words, as possible:
  1. Tree, house. 2. Chair, ladder. 3. Air, water.
- *Product improvement test* (Time allowed 6 minutes): Suppose you start with a toy horse. Think of as many new things or features to make it more useful and interesting.
- *Picture construction test* (Time allowed 20 minutes): In Figure 7.2, there are two simple geometrical figures, viz., a semicircle and a rhombus. You have to construct and elaborate pictures using each figure an integral part. For each picture, you have to give a separate title.



(a) (b)

Fig. 7.2 Creativity Picture Construction Test: (a) A semicircle, and (b) A rhombus

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- *Line figures completion test* (Time allowed 15 minutes): Ten incomplete line drawings are shown in Figure 7.3. You are required draw meaningful and interesting pictures using each of them and also give appropriate titles.

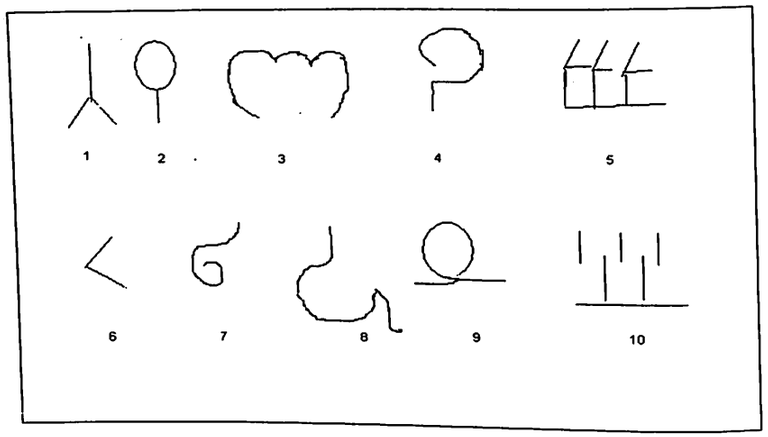


***Fig. 7.3** Creativity Line Figures Completion Test*

- *Picture construction test* (Time allowed 10 minutes): Seven triangles and seven ellipses are shown. The person is required to construct different meaningful and interesting pictures by using these figures in multiple associations.

Passi's battery of creativity tests

B.K. Passi constructed the test of creativity consisting of 3 verbal and 3 non-verbal tests as under:

I. Seeing problem test

There are four Items (a) shoes, (b) chair, (c) pen, and (d) post-card for which the testee is required to write down the defects or problems as he observes concerning these four objects. For example, for the time-piece or table clock, the defects and problems can be: (i) gets rusty, (ii) makes noise, (iii) breaks easily, (iv) needs winding etc.

The total time for the 4 items is 8 minutes.

II. Unusual uses test

There are two cells for (a) piece of cloth and (b) bottle in which all the possible unusual uses of these two items are to be written down as quickly as possible. As for example, the unusual uses of a match box are: (i) for toy making, (ii) for using as a container, (iii) to learn counting.

The total time for these 2 items is 8 minutes.

III. Consequences test

There are four statements (a) if human beings start flying like birds (b) if all houses start flying (c) if all people become mad (d) if all females turn male. The testees are required to write down under each statement all the possible consequences; they could think of in 8 minutes for all the four statements.

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IV. Test of inquisitiveness

There are certain things put covered on the table and the testees are asked to write down all the questions briefly on the answer sheet when the things are uncovered. The questions can be of any type, but each question must be different and independent and cannot be answered easily on the basis of simple observations.

The total time is 6 minutes.

V. Square puzzle test

There are 5 triangular and 5 quadrilateral pieces of thick paper or cardboard given to the subject and he is required to make a square with the help of these 10 pieces. There is no overlapping or blank space left over. The required time allotted is 3 minutes.

VI. Blocks test of creativity

There are two boxes each containing 19 identical cubes and 12 semi-cubs, each surface of the blocks is painted with different colours. The testee is required to make as many different patterns or structures of things as possible be using cubes from one box at a time and arranging them on one cardboard in rotation and each time to show the pattern to the tester. The patterns could be as interesting as possible. The patterns for example, can be of a blackboard, an arrow or a maze. The pattern is not to be repeated and the blocks could be placed in anyway liked.

The total time allowed is 10 minutes.

Nurturing and stimulation of creativity

Creativity, as a natural, needs stimulation and nourishment. Most creative talent, unless it is given proper training, education and opportunities for expression, is wasted. It becomes essential, therefore, for teachers as well as parents to realize the need of creating an environment conductive to full growth and development of the creative abilities of children.

Proper stimulating and nurturing of the traits which help to develop creativity, namely, originality, flexibility, ideational fluency, divergent thinking, self-confidence, persistence, sensitiveness, ability to see relationship and make associations etc., are essential for this and may be achieved through the flowing practices.

(i) **Freedom to respond:** Most often, teachers and parents expect routine, fixed responses from children, and thus kill the creative spark by breeding conformity and passivity. We should allow adequate freedom to our children in responding to a situation. They should be encouraged to think our as many ideas as they can for the solution of a problem. We must also let them have their own way when they need a particular kind of novel expression strongly enough.

(ii) **Opportunity for ego involvement:** Feeling like 'this is my creation', 'I have solved it', give much satisfaction to children. Actually, a child can be expected to put in determined efforts into creative activities only when his ego is involved, i.e., when he feels that a particular creative work is the outcome of his efforts. We should, therefore, provide opportunities to children to derive satisfaction from identifying themselves as the cause of a product.

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(iii) **Encouraging originality and flexibility:** Originality on the part of children in any form should be encouraged. Passive submission to the facts, unquestioning mimicry, and memorization by rote discourage creative expression and should, therefore, be checked as far as possible. If children seek to change their methods of learning a task or solving a problem, they should be encouraged to do so. Adequate training can also be given by making them answer problems like: 'how would you dig the earth if you don't have a spade or, how would you draw an angle if you do not have a proper instrument for drawing it or, how would you cross a river if there is no bridge over it'?

(iv) **Removal of hesitation and fear:** In countries like India, there seems to be a great hesitation mixed with a sense of inferiority and fear in taking the initiative for creative expression. We, generally come across comments like 'I know what I mean, but I cannot write (or speak) before others'. The causes of such diffidence and fear should be discovered and removed as far as possible. The teachers and parents should encourage and persuade such children to express themselves by saying or writing something, anything, no matter how crude it may be.

(v) **Providing appropriate opportunities for creative expression:** A healthy atmosphere, favourable for creative thinking and expression is essential for the stimulation and nourishment of creativity among children. The rate of learning must be balanced with its application, passive receptivity with challenging productivity, and certainty with and adventure. The child should never be snubbed for his curiosity and creativity. There is need of a sympathetic atmosphere in school and at home. Co-curricular activities in schools can be used for providing opportunities for creative expression. Religious festivals, and social get-togethers, exhibitions etc., can also provide the opportunity for creative expression. Even regular class-work can be arranged in such a way as to stimulate and develop creative thinking among children.

(vi) **Developing healthy habits among children:** Industriousness persistence, self-reliance and self-confidence are some of the qualities that are helpful in creative output. Children should, therefore, be helped to imbibe these qualities. Moreover, they should be encouraged to stand up against criticism of their creative expression. They should be made to feel that whatever they create is unique and expresses what they desire to express.

(vii) **Using the creative resources of the community:** Children should be made to visit the centre of art, scientific, and industrial creative work. This may stimulate and inspire them for creative work. Creative artists, scientists and creative persons from different fields may also be occasionally invited to the school to interact with the children in an effort to enhance the scope of knowledge of children and kindle the spark of creativity in them.

(viii) **Avoidance of blocks to creative thinking:** Factors like conservation, faulty methods of teaching, unsympathetic treatment, fixed and rigid habits of work, anxiety and frustration, excessively high standards of achievement for low levels of work, over-emphasis on school marks, authoritarian attitude of teachers and parents etc., are known to be detrimental to the growth of creativity among children. As far as possible, parents and teachers should, therefore, try to avoid such factors in upbringing and educating the children.

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(ix) **Proper organization of the curriculum:** Learning experiences in the form of curricula should be so designed as to foster creativity among children. For this purpose, the school curriculum should be organized primarily on the basis of concepts rather than facts. It should also cater to the individual needs of each student rather than to the generalized needs of all students. It should also follow the general philosophy that truth is something to be sought for rather than something to be revealed. It should be quite flexible and make provision for studying and working without the threat of evaluation. In a nutshell, the curriculum should reflect what is expected from the creative children in terms of fluency, flexibility, originality, divergent thinking, inventiveness and elaboration etc.

(x) **Reform in the evaluation system:** The Indian education system is totally examination oriented; and appropriate reform must, therefore, be made in its evaluation system if creativity is to be nurtured. The emphasis on memorization by rote, fixed and rigid single responses, and convergent thinking etc., which kills creativity of the children should be abandoned; and a proper evaluation system adopted for encouraging complete and blanked experiences in developing their creative behaviour.

(xi) **Use of special techniques for fostering creativity:** Researchers in the field of creativity have suggested special techniques and methods for fostering creativity among children. A few of these are as follows:

(a) *Brainstorming:* Brainstorming is a strategy or technique for allowing a group to explore ideas without judgment or censure. In practice, the children may be asked to sit in a group for solving a problem and attacking it without any inhibition from many angles. To start with, the students may be provided with a focus e.g., particular problems like 'student unrest', or the growing unemployment in India, or how to check truancy in schools, etc. The students are then asked to suggest ideas as rapidly as possible and the following norms are observed:

(i) All ideas are encouraged and appreciated, therefore, no criticism is allowed during the brainstorming session.

(ii) Students are encouraged to come out with as many ideas as possible, even unusual and unorthodox ones.

(iii) They are not restricted to new ideas only and are also encouraged to enlarge upon ideas put forward by fellow students.

(iv) No evaluation or comment of any sort is to be made until the session is over. At the end of the session, all the ideas received (preferably written on the blackboard) should be discussed in a free, frank and open environment, and the most viable ideas accepted for solution of the problem in hand.

(b) *Use of teaching models:* Some of the teaching models developed by educationists may prove quite beneficial in developing creativity among children. For example, Bruner's Concept Attainment Model helps in developing creativity in children for the attainment of various concepts.

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Similarly, such man's inquiry training model is very helpful in developing creativity; among children in addition to imparting training in the acquisition of scientific inquiry skills.

(c) *Use of gaming technique:* Gaming techniques, in a playful spirit, help the children in the development of creative traits. These techniques provide valuable learning experiences in a relaxed, spontaneous and evaluative situation. Both verbal and non-verbal transaction of ideas, children may be asked to name all the round things they can think of, tell all the different ways a knife may be used, or all the ways in which a cat and a dog are alike.

In non-verbal transactions, the children may be asked to build a cube, construct or complete a picture, draw and build patterns, interpret the patterns of drawings and sketches, and build something out of the raw material given to them.

(xii) Teaching by example: Children are very imitative. Teachers and parents who themselves follow the beaten track and do not show any originality for fear of being wrong, or never experience the excitement of creating or doing something new, fail to simulate creativity among the children in their charge. They must, therefore, themselves develop the habit of creative thinking. They should learn to believe in change, novelty and originality, and themselves experience the creative process. Their behaviour and style of teaching must reflect their love for creativity. Then, and only then, they can inspire the children to be creative.

7.4 NON-TESTING TECHNIQUES

Here we will discuss some of the non-testing techniques of guidance and counselling.

7.4.1 Observation

Observations have lead to some of the most important scientific discoveries in human history. Charles Darwin used his observations of animal and marine life at the Galapagos Islands to help him formulate his theory of evolution that he described in *On the Origin of Species.* Today, social scientists, natural scientists, engineers, computer scientists, educational researchers and many others use observations as a primary research method.

The kind of observations one makes depends on the subject being researched. Traffic or parking patterns on a campus can be observed to ascertain what improvements could be made. Clouds, plants, or other natural phenomena can be observed as can people, though in the case of the latter one may often have to ask for permission so as to not violate any privacy issue.

Observation may be defined as a process in which one or more persons monitor some real-life situation and record pertinent occurrences. It is used to evaluate the overt behaviour of the individual in controlled and uncontrolled situations.

According to Jahoda: 'Observation method is a scientific technique to the extent that it (a) serves a formulated research purpose, (b) is planned systematically rather than occurring haphazardly, (c) is systematically recorded and related to more general propositions than presented as a set of interesting curios, and (d) is subjected to checks

Check Your Progress

10. State two characteristics of personality.
11. What are the two important determinants of personality?
12. State two techniques of personality test.
13. Define creativity.
14. Name some tests available to measure creativity.

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and controls with respect to validity, reliability, and precision much as is all other scientific evidence.'

According to Good and Hatt: 'Observation may take many forms and is at once the most primitive and the most modern of research techniques. It includes the most casual, uncontrolled experiences as well as the most exact film records of laboratory experimentation.'

Types

Observations may be classified in two types:

1. Participant Observation

In this type of observation, the observer is the active participant of the group or process. He participates as well as observes as a part of phenomenon, for e.g., to study the behaviour of management students towards studying and understanding marketing management, an observer or researcher has to participate in discussion with students without telling them about observation or purpose. When the respondents are unaware of observations, only then can their natural interest be studied.

Merits: The merits of participated observations are:

- Respondent group can be understood deeply by researcher
- Context which is meaningful to observed behaviour can be recorded or documented by the researcher.

Demerits: The demerits of participant observation are:

- Narrowing the range of observation if particular hierarchy of power is existing in the group under the limitation of his position in the group
- Emotional feelings of observer may cause the loss of objectivity.

2. Non-participant Observation

In non-participant observation, the observer does not participate in the group process. He acknowledges the behaviour of group without telling respondents. It requires many skills to record observations in an unnoticed manner.

3. Direct Observation

Direct observation is when the observer and researcher personally observe all happenings of a process or an event when event happens. In this method observer records all relevant aspects of event which are necessary for study. He is free to change locations and focus of the observation. One major limitation of the method is that observer may not be able to cover all relevant events when events are happening quickly.

4. Indirect Observation

This is when the physical presence of observer is not required and recording is done by the help of mechanical, photographic or electronic devices, e.g., close circuit TV(CCTV) cameras observing the behaviour of customer in a showroom. It provides a permanent record for analysis of different aspects of the event.

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5. Controlled Observation

All observations are made under prespecified conditions over extrinsic and intrinsic variables by adopting experimental design and systematically recording observations. Controlled observations are carried out either in a laboratory or a field.

6. Uncontrolled Observation

There is no control over extrinsic and intrinsic variables. It is mainly used for descriptive research. Participant observation is a typical uncontrolled one.

Recording techniques

Many different techniques may be employed to study and document a subject's behaviour. The data collection techniques are all accurate but may be suitable for different purposes. While certain methods help gather detailed descriptions of behaviour, certain others facilitate documenting behaviour promptly and with bare minimum description.

- **Anecdotal records:** Anecdotal records refer to a few sentences jotted down in a notebook. These sentences pertain to what the subject is engaged in at a particular moment. Only those behaviours that can be seen or heard and that can be counted are documented while creating an anecdotal record.
- **Narrative description:** Narrative description is also known as running behaviour record and specimen record, and is a formal method of observation. When following this technique, you are supposed to record continuously, as detailed as possible, what the subject is doing and saying when alone or when interacting with other people. In its methodology, it is similar to anecdotal record but is definitely more detailed. The researcher studies the context setting, the behaviour patterns, and the order in which they take place. The main aim of this technique is to gain a objective description of a subject's behaviour without conjecture, analysis, or assessment.
- **Checklists:** Checklists are usually standardized forms which list specific skills and behaviours based on standard levels, or are specifically compiled by the researcher for a particular research study.
- **Interviewing:** In this observation technique, the researching team tries to identify the subject's feelings or beliefs that are not visible through simple observation. During the process of interviewing, everything that the subject says must be recorded exactly as it is. The interviewer should avoid any kind of editing of the interview subscript.
- **Time sampling:** This method is distinct from others in two ways—it monitor and keeps account of a few chosen samples of subject's behaviour, and only during prearranged periods of time. When a behaviour pattern is seen during the specified time interval, it is recorded. This technique therefore helps to gather representative examples of behaviour.
- **Frequency counts:** In some cases, a researcher may be more interested in studying the frequency of an occurrence or behaviour or another pattern, such as how often a consumer buys a particular product or how often an individual started a conversation with a colleague. To get this data, the researcher will need to keep a count of the frequency of the particular behaviour and study how long the behaviour lasts. This is usually done by simply marking an occurrence on a chart each time the behaviour is repeated.
- **Event sampling:** This technique is focused on observing specific behaviours or events in a subject's behaviour pattern. However, it does not take into account the frequency or the length of the recording interval.

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Advantages

The advantages of observation are as follows:

- This technique is employed to observe characteristics of various designs of school buildings and equipment
- For coaching purposes, an observation of various skills in games and athletics is made
- A study of the significant aspects of personality which express themselves in behaviours can be made
- The behaviour of the children in a classroom situation can be effectively analysed
- The behaviour of those who cannot read, write or speak can be observed
- Observation of skills in the workshop is made directly
- Observation of pupils' behaviour as recorded in the cumulative records of pupils could serve as anecdotal evidence and supply data for research studied

Characteristics of observation for research

The characteristics of observation for research are as follows:

- Observation schedule should be specific
- Steps should be systematic
- It should be quantitative
- It should be recorded immediately
- It should be made by experts
- Schedule should be scientific. We should be able to check and substantiate the results

Symonds gives a list of nine essential characteristics of good observation:

(i) Good eyesight
(ii) Alertness
(iii) The ability to estimate
(iv) The ability to discriminate
(v) Good physical condition
(vi) An immediate record
(vii) Good perception
(viii) Freedom from preconceptions
(ix) Emotional disinterest

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Planning administration aspect of observation

This includes:

(a) Securing an appropriate group of persons to observe

(b) Deciding and arranging any special conditions for the group

(c) Determining the length of each observation period, the interval between periods and the number of periods

Points to be considered while defining the activities are as follows:

(a) Inclusion of those activities which are true representatives of the general category which one is studying

(b) Defining those activities very carefully

While arranging for the record, the following points should receive attention:

(a) Deciding the form for recording so as to make note taking easy and rapid

(b) Deciding the use of appropriate symbols, abbreviations and some use of shorthand

One can train oneself to record by:

(a) Training oneself to observe others as perception improves with practice

(b) Studying manuals that list observation techniques

Planning effective observation include the following:

- Sampling to be observed should be adequate. There should be an appropriate group of subjects
- Units of behaviour should be defined as accurately as possible
- Method of recording should be simplified
- Detailed instructions may be given to observers to eliminate the difference in perspective of observers
- Too many variables may not be observed simultaneously
- Excessively long periods of observation without interspersed rest periods should be avoided
- Observers should be fully trained
- Observers should be well equipped
- Conditions of observation should remain constant
- Number of observations should be adequate
- Records of observation must be comprehensive
- Length of each observation period, interval between periods and number of periods should be clearly stated
- Interpretations should be carefully made

Disadvantages

The disadvantages of observation are as follows:

- It is very difficult to establish the validity of observations
- Many items of observation cannot be defined
- The problem of subjectivity is involved
- Observation may give undue stress to aspects of limited significance simply because they can be recorded easily, accurately and objectively
- Various observers observing the same event may concentrate on different aspects of a situation
- The observer has little control over the physical situation
- Children being observed become conscious and begin to behave in an unnatural manner
- Many children try to pose and exhibit at the time of observation
- There are certain situations which the observer is not allowed to observe, and he is helpless in that way to produce an accurate account
- It may not be feasible to classify all the events to be observed
- Observation is a slow and laborious process
- There may be lack of agreement among the observers
- The data to be observed may be unmanageable
- Observation needs competent observers and it may be difficult to find them
- Observation is a costly affair. It involves lot of expenses on travelling, staying at the places where the event is taking place and purchase of sophisticated equipment.

7.4.2 Questionnaire

A questionnaire is a tool for research, comprising a list of questions whose answers provide information about the target group, individual or event. Although they are often designed for statistical analysis of the responses, this is not always the case. This method was the invention of Sir Francis Galton. Questionnaire is used when factual information is desired. When opinion rather than facts are desired, an opinionative or attitude scale is used. Of course, these two purposes can be combined into one form that is usually referred to as 'questionnaire'.

Questionnaire may be regarded as a form of interview on paper. The procedure for the construction of a questionnaire follows a pattern similar to that of the interview schedule. However, because the questionnaire is impersonal, it is all the more important to take care of its construction.

A questionnaire is a list of questions arranged in a specific way or randomly, generally in print or typed and having spaces for recording answers to the questions. It is a form which is prepared and distributed for the purpose of securing responses. Thus a questionnaire relies heavily on the validity of the verbal reports.

According to Goode and Hatt, 'in general, the word questionnaire refers to a device for securing answers to questions by using a form which the respondent fills himself'.

Barr, Davis and Johnson define questionnaire as, 'a questionnaire is a systematic compilation of questions that are submitted to a sampling of population from which information is desired' and Lundberg says, 'fundamentally, questionnaire is a set of stimuli to which literate people are exposed in order to observe their verbal behaviour under these stimuli'.

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Types

Commonly used questionnaires are as follows:

(i) Closed form: Questionnaire that calls for short, check-mark responses are known as closed-form type or restricted type. They have highly structured answers like mark a yes or no, write a short response or check an item from a list of suggested responses. For certain type of information, the closed form questionnaire is entirely satisfactory. It is easy to fill out, takes little time, keeps the respondent on the subject, is relatively objective and is fairly easy to tabulate and analyse.

For example, How did you obtain your Bachelors' degree? (Put a tick mark against your answer)

(a) As a regular student

(b) As a private student

(c) By distance mode

These types of questionnaires are very suitable for research purposes. It is easy to fill out, less time consuming for the respondents, relatively objective and fairly more convenient for tabulation and analysis. However, construction of such type of questionnaire requires a lot of labour and thought. It is generally lengthy as all possible alternative answers are given under each question.

(ii) Open form: The open form, or unrestricted questionnaire, requires the respondent to answer the question in their own words. The responses have greater depth as the respondents have to give reasons for their choices. The drawback of this type of questionnaire is that not many people take the time to fill these out as they are more time consuming and require more effort, and it is also more difficult to analyse the information obtained.

Example: Why did you choose to obtain your graduation degree through correspondence?

No alternative or plausible answers are provided. The open form questionnaire is good for depth studies and gives freedom to the respondents to answer the questions without any restriction.

Limitations of open questionnaire are as follows:

- They are difficult to fill out
- The respondents may never be aware of all the possible answers
- They take longer to fill
- Their returns are often few
- The information is too unwieldy and unstructured and hence difficult to analyse, tabulate and interpret

Some investigators combine the approaches and the questionnaires carry both the closed and open form items. In the close ended questions, the last alternative is kept open for the respondents to provide their optimum response. For example, 'Why did you prefer to join B.Ed. programme? (i) Interest in teaching (ii) Parents' wish (iii) For securing a government job (iv) Other friends opted for this (v) Any other.'

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(iii) Pictorial form: Pictorial questionnaires contain drawings, photographs or other such material rather than written statements and the respondents are to choose answers in terms of the pictorial material. Instructions or directions can be given orally. This form is useful for working with illiterate persons, young children and persons who do not know a specific language. It keeps up the interest of the respondent and decreases subjects' resistance to answer.

Questionnaire administration modes

Main modes of questionnaire administration are as follows:

- **Through mail:** Mailed questionnaires are the most widely used and also perhaps the most criticized tool of research. They have been referred to as a 'lazy person's way of gaining information'. The mailed questionnaire has a written and signed request as a covering letter and is accompanied by a self-addressed, written and stamped envelope for the return by post. The method of mailing out the questionnaire is less expensive in terms of time, funds required; it provides freedom to the respondent to work at his own convenience and enables coverage of a large population.
- **Personal contact/face-to-face:** Personally administered questionnaires both in individual and group situations are also helpful in some cases and have the following advantages over the mailed questionnaire (i) the investigator can establish a rapport with the respondents; (ii) the purpose of the questionnaire can be explained; (iii) the meaning of the difficult terms and items can be explained to the respondents; (iv) group administration when the respondents are available at one place is more economical in time and expense; (v) the proportion of non-response is cut down to almost zero; and (vi) the proportion of usable responses becomes larger. However, it is more difficult to obtain respondents in groups and may involve administrative permission which may not be forthcoming.
- **Computerized questionnaire:** It is the one where the questions need to be answered on the computer.
- **Adaptive computerized questionnaire:** It is the one presented on the computer where the next questions are adjusted automatically according to the responses given as the computer is able to gauge the respondent's ability or traits.

Appropriateness of questionnaire

The qualities and features which make questionnaires an effective instrument of research and help to elicit maximum information are discussed below:

- **Type of information required:** The usefulness and effectiveness of a questionnaire is determined by the kind of information sought. Not every type of questionnaire can be elicited through it. A questionnaire which will consume more than 10-20 minutes is unlikely to be responded to well. Also, the questions should be explicit and capable of clear-cut replies.
- **Type of respondent reached:** A good deal depends upon the types of respondents covered by the questionnaire. All types of individuals cannot be good respondents. Only literate and socially conscious individuals would give

any consideration to a questionnaire. Also, the respondent must be competent to answer the kind of questions contained in a particular questionnaire.

- **Accessibility of respondents:** Questionnaires sent by mail can help to survey the opinion of the people living in far-flung places.
- **Precision of the hypothesis:** Appropriateness of the questionnaire also depends upon how realistic is the hypothesis in the mind of the researcher. The researcher must frame his questions in such a manner that they elicit responses needed to verify the hypothesis.

Steps for preparing and administering the questionnaire

The steps involved in preparing and administering the questionnaire are as follows:

(i) **Planning the questionnaire:** One should get all the help possible in planning and constructing the questionnaire. Other questionnaires should be studied and items should be submitted for criticism to other members of the class or faculty.

(ii) **Modifying questions:** Items can be refined, revised or replaced by better items. If a computer is not readily available for easily modifying questions and rearranging the items, it is advisable to use a separate card or slip for each item. This procedure also provides flexibility in arranging items in the most appropriate psychological order before the instrument is finalized.

(iii) **Validity and reliability of questionnaire:** Questionnaire designers rarely deal with the degree of validity of reliability of their instrument. There are ways to improve both validity and reliability of questionnaires. Basic to the validity of a questionnaire is asking questions in the least ambiguous way. The meaning of all terms must be clearly defined so that they have the same meaning to all respondents. The panel of experts may rate the instrument in terms of how effectively it samples significant aspects of content validity. The reliability of the questionnaire may be tested by a second administration of the instrument with a small sub-sample, comparing the responses with those of the first. Reliability may also be estimated by comparing the responses of an alternate form with the original from.

(iv) **Try out or pilot testing:** The questionnaire should be tried on a few friends and acquaintances. What may seem perfectly clear to the researcher may be confusing to the other person who does not have the frame of reference that the researcher has gained from living with and thinking about an idea over a long period. It is also a good idea to pilot test the instrument with a small group of persons similar to those who will be used in the study. They may reveal defects that can be corrected before the final form is printed.

(v) **Information level of respondents:** It is important that the questionnaire be sent only to those who possess the desired information and are likely to be sufficiently interested to respond objectively and conscientiously. A preliminary card asking whether the individual would respond is recommended by some research authorities.

(vi) **Getting permission:** If the questionnaire is to be used in a public school, it is essential that approval for the project is secured from the Principal. Students should be informed that participation is voluntary. If the desired information is delicate or intimate in nature, the possibility of providing for anonymous

responses should be considered. The anonymous instrument is most likely to produce objective and honest responses.

(vii) **The cover letter:** A courteous, carefully constructed cover letter should be included to explain the purpose of the study. The cover letter should assure the respondent that all information will be held in strict confidence. The letter should promise some sort of inducement to the respondent for compliance with the request. In educational circles, a summary of questionnaire results is considered an appropriate reward, a promise that should be scrupulously honoured after the study has been completed.

(viii) **Follow-up procedures:** Recipients are often slow to return completed questionnaires. To increase the numbers of returns, a vigorous follow-up procedure may be necessary. A courteous postcard reminding the recipient may bring in some additional responds. A further step in follow-up may involve a personal letter or reminder. In extreme cases, it may be appropriate to send the copy of questionnaire with a follow-up letter.

(ix) **Analysing and interpreting questionnaire responder:** Data obtained by the questionnaire is generally achieved through calculation and counting. The totals are converted into proportion or percentages. Calculation of contingency coefficient of correlation is often made in order to suggest probability of relation among data. Computation of chi-square statistics in is also advisable.

Disadvantages of the questionnaire method

Like all other methods, the questionnaire is also limited in value and application. This means that it cannot be used in every situation and that its conclusions are not always reliable. Chief limitations of the method are as follows:

- **Limited response:** As noted earlier, this method cannot be used with illiterate or semi-illiterate groups. The number of persons who cooperate and respond to the questionnaire is very small.
- **Lack of personal contact:** There is very little scope of personal contact in this method. In the absence of personal contact, very little can be done to persuade the respondents to fill up the questionnaire.
- **Useless in-depth problems:** If a problem requires deep and long study, it is obvious that it cannot be studied by the questionnaire method.
- **Possibility of wrong answers:** A respondent may not really understand a question or may give the answer in a casual manner. In both cases, there is a strong likelihood of misleading information being given.
- **Illegibility:** Some persons write so badly that it is difficult to read their handwriting.
- **Incomplete response:** There are people who give answers which are so brief that the full meaning is incomprehensible.

Importance of questionnaire method

As a matter of fact, this method can be applied in a very narrow field. It can be used only if the respondents are educated and willing to cooperate. However, it is still widely used, owing to the following merits:

- **Economical:** The questionnaire requires paper, printing and postage only. There is no need to visit the respondents personally or continue the study over a long period.
- **Time saving:** Besides saving money, the questionnaire also saves time. Data can be collected from a large number of people within a small time frame.
- **Most reliable in special cases:** It is a perfect technique of research in some cases.
- **Research in wide area:** Mailed questionnaire comes very handy if the sample comprises of people living at great distances.
- **Suitable in specific type of responses:** The information about certain problems can be best obtained through questionnaire method.

7.4.3 Interview

One of the main methods of data collection is conducting interviews. It takes place as a two-way conversation between the researcher and the respondent, whereby information is gathered by asking topic related questions.

We learn not only from the respondents' responses but also his gestures, facial expressions and pauses. Interviewing can be conducted either face-to-face or over the telephone by skilled personnel by using a structured schedule or an unstructured guide.

According to Rummel J. Francis: 'The interview method of collecting data requires the actual physical proximity of two or more persons, and generally requires that all the normal channels of communication be open to their use. It is necessary to see one another, to hear each other's voices, to understand one another's language, and to use all that is psychologically inherent in physical proximity. It usually entails a non-reciprocal relation between the individuals concerned. One party desires to get information from another — one party interviews the other — for a particular purpose.'

Theodore L. Torgerson has stated that the interview method of study extends certain aspects of the observational technique.

Thus, the interview method permits the gathering of development data to supplement the cross-sectional data obtained from observations. The interviewer can probe into casual factors, determine attitudes, discover when the problem started, enlist the interviewee in an analysis of his own problem and secure his support of the therapy to be applied.

Types

The different types of interviews are as follows:

- **Group interview:** A proper setting for group interviews requires a group of not more than 10 to 12 persons with some social, intellectual, and educational homogeneity, which ensures effective participation by all. For a full spontaneous participation of all, it is better to arrange a circular seating arrangement.
- **Diagnostic interview:** Its purpose is to locate the possible causes of an individual's problems, getting information about his past history, family relations and personal adjustment problem.

- **Clinical interview:** Such an interview follows after the diagnostic interview. It is a means of introducing the patient to therapy.
- **Research interview**: Research interview is aimed at getting information required by the investigator to test his hypothesis or solve his problems of historical, experimental, survey or clinical type.
- **Single interviewer or panel interviews:** For the purpose of research, a single interviewer is usually present. In case of selection and treatment purposes, panel interviews are held.
- **Directed interview:** It is structured, includes questions of the closed type and is conducted in a prepared manner.
- **Non-directive:** It includes questions of the open-end form and allows much freedom to the interviewee to talk freely about the problem under-study.
- **Focused interview:** It aims at finding out the responses of individuals to exact events or experiences rather than on general lines of enquiry.
- **Depth interview:** It is an intensive and searching type of interview. It emphasizes certain psychological and social factors relating to attitudes, emotions or convictions.

It may be observed that on occasions several types are used to obtain the needed information.

Other classifications of interviews are as follows:

- Intake interview, as the initial stage in clinic and guidance centres
- Brief talk contacts as in schools and recreation centres
- Single-hour interview
- Clinical-psychological interview, stressing psychotherapeutic counselling and utilizing case history data and active participation by the counselor in the re-education of the client
- Psychiatric interviews, similar to psychological counselling, but varying with the personality and philosophical orientation of the individual worker and with the setting in which used
- Psychoanalytic interviews
- The interview form of test
- Group interviews for selecting applicants for special course
- Research interview

Important elements of research interview

The important elements of research interview are as follows:

(i) Preparation for research interview

- Decide the category and number of persons that you would like to interview
- Have a clear conception of the purpose and the information required
- Prepare a clear outline, a schedule or a check list of the best sequence of questions that will systematically bring out the desired information

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- Decide the type of interview that you are going to use, i.e., structured or non-structured interview
- Have a well thought-out plan for recording responses
- Fix up the time well in advance
- Procure the tools to be used in recording responses

(ii) Executing an interview

- Be friendly and courteous and put the respondent at ease so that he talks freely
- Listen patiently to all opinions and never show surprise or disapproval of a respondent's answer
- Assume an interested manner towards the respondent's opinion, and as far as possible do not divulge your own
- Keep the direction of the interview in your own hands and avoid irrelevant conversation and try to keep the respondent on track
- Repeat your questions slowly and with proper emphasis in case respondent shows signs of failing to understand a particular question.

(iii) Obtaining the response

Perhaps the most difficult part of the job of an interviewer is to obtain a specific, complete response. People can often be evasive and answer 'do not know' if they do not want to make the effort of thinking. They can also misunderstand the question and answer incorrectly in which case the interviewer would have to probe more deeply.

An interviewer should be skilled in the technique as only then can he gauge whether the answers are incomplete or non-specific. Each interviewer must fully understand the motive behind the asking of the particular question and whether the answer is giving the information required. He should form the habit of asking himself, 'Does that completely answer the question that I just asked?'

Throughout, the interviewer must be extremely careful not to suggest a possible reply. The interviewer should always content himself with mere repetition (if the question is not understood to answer).

(iv) Reporting the response

There are two chief means of recording opinion during the interview. If the question is preceded, the interviewer need only check a box or circle or code, or otherwise indicate which code comes closest to the respondent's opinion. If the question is not preceded, the interviewer is expected to record the response verbatim.

The following points may be kept in view in this respect:

- Quote the respondents directly, just as if the interviewers were newspaper reporters taking down the statement of an important official without paraphrasing the reply, summarizing it in the interviewer's own words, 'polishing up' any slang, or correcting bad grammar that distorts the respondent's meaning and emphasis
- Ask the respondent to wait until the interviewer gets down 'that last thought'
- Do not write as soon as you have asked the question and do not write while the respondent talks. Wait until the response is completed

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- Use common abbreviations
- Do not record and evaluate the responses simultaneously

(v) Closing the interview

It should be accompanied by an expression of thanks in recognition of the respondent's generosity in sparing time and effort.

(vi) Use of tape recorder in interview

- It reduces the tendency of the interviewer to make an unconscious selection of data favouring his biases
- The tape recorded data can be played more than once, and thus it permits a thorough study of the data
- Tape recorder speeds up the interview process
- Tape recorder permits the recording of some gestures
- The tape recorder permits the interviewer to devote full attention to the respondent
- No verbal productions are lost in a tape recorded interview
- Other things being equal, the interviewer who uses a tape recorder is able to obtain more interviews during a given time period than an interviewer who takes notes or attempts to reconstruct the interview from memory after the interview has been completed

Indifferent attitude of the respondent and the role of the research worker

It is observed that the research worker is likely to encounter several problems arising out of the apathy of the respondents. In such a situation the following points may be kept in view:

(i) When the respondent is really busy and has no time, the field worker may request for a more convenient time.

(ii) When the respondent simply wants to avoid the interview and is not inclined to be bothered about it, the field worker should try to explain to him the importance of the study, and how his own response is of material value in the case.

(iii) When the respondent is afraid to give the interview as it affects his boss or the party to which he belongs or any other cause which is likely to harm his interest, the field worker must assure the respondent that absolute secrecy would be maintained by the researcher and the organization.

(iv) When the respondent does not hold a high opinion about the outcome of such interviews in general, or has a poor opinion about the research organization or institution conducting it, it is the duty of the research worker at such times to explain to him the importance of the problem and convince him regarding the status of the research body.

(v) When the respondent is suspicious and he thinks that that the enquiry is either from the income tax department or some other secret agency, at such times he may generally ask such questions. Who are you? Who told you our name? Have you interviewed the neighbour?, etc. The research worker should try to

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eliminate his suspicion. A letter of authority, the letter head or the seal of the research body would prove to be useful on such occasions.

(vi) When the respondent is unsocial or otherwise confined to his own family (such a tendency is mostly found in the case of newly married couples), the research worker at such times will try to create his interest in the subject of investigation.

(vii) When the respondent is too haughty and thinks it below his dignity to grant an interview to petty research workers, the investigator should get a letter of introduction from an influential person.

Advantages of interview over other techniques

- A well-trained interviewer can obtain more data and greater clarity by altering the interview situation. This cannot be done in a questionnaire.
- An interview permits the research worker to follow-up leads as contrasted with the questionnaire.
- Questionnaires are often shallow and they fail to dig deeply enough to provide a true picture of opinions and feelings. The interview situation usually permits much greater depth.
- It is possible for a skilled interviewer to obtain significant information through motivating the subject and maintaining rapport, other methods do not permit such a situation.
- The respondents when interviewed may reveal information of a confidential nature which they would not like to record in questionnaire.
- Interview techniques can be used in the case of children and illiterate persons who cannot express themselves in writing. This is not possible in a questionnaire.
- The percentage of response is much higher than in case of a mailed questionnaire.
- *Removal of misunderstanding*: The field worker is personally present to remove any doubt or suspicion regarding the nature of enquiry or meaning of any question or term used. The answers are, therefore, not biased because of any misunderstanding.
- *Creating a friendly atmosphere*: The field worker may create a friendly atmosphere for proper response. He may start a discussion, and develop the interest of the respondent before showing the schedule. A right atmosphere is very conducive for getting correct replies.
- *Possible to secure confidential interview*: The interviewee may disclose personal and confidential information which he would not ordinarily place in writing on paper. The interviewee may need the stimulation of personal contacts in order to be drawn out.
- *Advantages of clues*: The interview enables the investigator to follow-up leads and to take advantage of small clues, in dealing with complex topics and questions.
- *Permits exchange of ideas*: The interview permits an exchange of ideas and information. It permits 'give and take'.

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- *Useful in the case of some categories of persons*: The interview enables the interviewee to deal with young children, illiterates and those with limited intelligence or in who's state of mind is not quite normal.
- *Useful apart from research purposes*: Interviews are also used for pupil counselling, for selection of candidates for instructional purposes, for employment, for psychiatric work, etc.
- *Possibility of asking supplementary questions*: The respondent does not feel tired or bored. Supplementary questions may be put to enliven the whole discussion.
- *Avoiding handwriting*: The difficulties of bad handwriting of the respondent, use of pencil, etc., are also avoided as every schedule is filled in by the interviewer.
- *A probe into life pattern is possible*: The personal contact with the respondent enables the field worker to probe more deeply into the character, living conditions and general life pattern of the respondent. These factors have a great bearing in understanding the background of any reply.
- *Reliable information*: The information gathered through interviews has been found to be fairly reliable.
- *Deeper probe*: It is possible for the interviewer to probe into attitudes, discover the origin of the problem, etc.
- *Interview technique is very close to the teacher*: It is generally accepted that no research technique is as close to the teacher's work as the interview.
- *Possibility of repetition*: Sometimes interviews can be held at suitable intervals to trace the development of behaviour and attitudes.
- *Useful for several purposes*: Interviews can be used for student counselling, occupational adjustment, selection of candidates for educational courses, etc.
- *Wide applicability*: Interviews can be used for all kinds of research methods — normative, historical, experimental, case studies and clinical studies.
- *Cross questioning*: Interview techniques provide scope for cross questioning.
- *Command of the interviewer*: This technique allows the interviewer to remain in command of the situation throughout the investigation.
- *Wider opportunities to know the interviewee*: Through the respondent's incidental comments, facial expression, bodily movements, gestures, etc., an interviewer can acquire information that could not be obtained easily by other means.
- *Useful for judging frankness, etc,*: Cross questioning by the interviewer can enable him to judge the sincerity, frankness and insight of the interviewee.

Disadvantages of the interview method

The method of interview, in spite of its numerous advantages, also has the following limitations:

- **Very costly:** It is a very costly affair. The cost per case is much higher in this method than in case of mailed questionnaires. Generally speaking, the cost per questionnaire is much less than the cost per interview.

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A large number of field workers may have to be engaged and trained in the work of collection of data. All this entails a lot of expenditure and a research worker with limited financial means finds it very difficult to adopt this method.

- **Biased information:** The presence of the field worker while encouraging the respondent to reply, may also introduce a source of bias in the interview. At times the opinion of the respondent is influenced by the field worker and his replies may not be based on what he thinks to be correct but what he thinks the investigator wants.
- **Time consuming:** It is a time consuming technique as there is no guarantee how much time each interview can take, since the questions have to be explained, interviewees have to assured and the information extracted.
- **Expertness required:** It requires a high level of expertise to extract information from the interviewee who may be hesitant to part with this knowledge.

Among the important qualities to be possessed by an interviewer are objectivity, insight and sensitivity.

7.5 SUMMARY

In this unit, you have learnt that:

- Aptitude of an individual towards some work fits him in the work like round peg in the round hole and square peg in the square hole.
- Aptitude is predictive in nature.
- An individual with interest and aptitude for teaching profession will get success in life; but if only interest is present without aptitude, the question of success will arise.
- An aptitude must be developed by practice and training to become an ability. Two individual may have aptitude of one kind but the degree of aptitude will be different.
- Aptitude tests assess the degree of an individual's inclination towards something.
- General aptitude tests are also known as 'scholastic aptitude tests'.
- Interest includes all the psycho-physical dispositions which distinguishes individuals from individuals.
- Interests are the product of heredity and environment; it determines one's personality.
- Expressed interests refer to the verbal expression of an individual towards an object, place, person, activity or profession.
- Manifested interests refer to the active participation of an individual in a particular type of work or activity. In case of tested interests, the interests of an individual are tested by different kinds of objective tests.
- Inventoried interests refer to the interests which are expressed through standardized subjective tests.
- Scientific interest refers to the interest of the people in scientific activities.

Check Your Progress

15. What are two types of observation?
16. Mention three limitations of observation.
17. What are the modes of getting information through questionnaire?
18. What is interview?
19. What are the various types of interviews?
20. Give one advantage of using a tape recorder in an interview.
21. Name one advantage that the interview has over other methods of research like questionnaire.

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- Interest test helps in career selection for the students.
- Minnesota Vocational Interest Inventory (MVII) was developed for men oriented towards skilled and semi-skilled trades.
- There are two types of interest inventory used:
  - o Vocational interest inventories
  - o General or non-vocational interest inventories
- In psychology, intelligence remains the most widely discussed area of inquiry.
- Several theories and tests have been designed to measure intelligence.
- Observation is of two types:
  - o participant observation
  - o non-participant observation
- The scope of unstructured interview is more than structured interview because in the former case the interviewers are not restricted to a particular set of predetermined questions.
- In personality inventory, an effort is made to estimate the presence and strength of each specified trait through a number of items representing a variety of situations in which the individuals generalized mode of responding may be sampled.
- Personality inventory is of two types:
  - o uni-dimensional personality inventory
  - o multi-dimensional personality inventory
- Projective techniques are the means to dig out the intricacies of human behaviour which are below the surface, and are incapable of exposure by subjective and objective techniques such as observation, peer ratings and self-rating questionnaires etc.
- Projective techniques are most successfully used for eliciting suppressed desires, feelings, ambitions, attitudes and emotions, guilt and complexes etc.
- Wallas described the creative process as consisting of four stages:
  - o Preparation
  - o Incubation
  - o inspiration or illumination
  - o verification or revision
- The factors or dimensions of creativity commonly measured through creativity tests are as follows:
  - o Fluency
  - o Flexibility
  - o Originality
  - o unusual responses
  - o resistance to premature closure
  - o elaboration
- The curriculum should reflect what is expected from the creative children in terms of fluency, flexibility, originality, divergent thinking, inventiveness and elaboration etc.

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7.6 KEY TERMS

- **Interest inventory:** It is a device prepared continuously to know the likes and dislikes of an individual in vocations and works.
- **Mental age:** The mental ability of a person expressed at the age at which an average person demonstrates the same ability is known as mental age.
- **Evaluation:** It is the judgment regarding the amount, value or number of something.
- **Verbal intelligence:** The ability to understand and resolve language-based problems.
- **Non-verbal intelligence:** The ability to comprehend and solve visual and spatial problems.
- **Personality:** The external appearance and internal qualities of an individual is called personality.
- **Thematic apperception test:** It is a technique in which the respondents are to tell stories according to the pictures shown to them.
- **Questionnaire:** It is a tool for research comprising a list of questions whose answers provide information about the target group, individual or event.

7.7 ANSWERS TO 'CHECK YOUR PROGRESS'

1. 'Aptitude' refers to a special capability of an individual, which makes him distinct from others in an achievement field.
2. The three important types of aptitude are: (i) Aptitude in music, (ii) Aptitude in law, and (iii) Teaching aptitude.
3. The types of aptitude tests are as follows:
   (i) General Aptitude Tests
   (ii) Specified Aptitude Tests
   (iii) Differentiated Aptitude Tests
4. The four types of interests are as follows:
   (i) Expressed interests
   (ii) Manifested interests
   (iii) Tested interests
   (iv) Inventoried interests
5. Two methods for testing interest are as follows:
   (i) Interest Inventory, and
   (ii) Observation
6. 'Interest inventory' is a device which is prepared continuously to know the likes and dislikes of an individual in vocations and works. Some interest inventories are also made for educational curricula or field of study, which is important for career selection.

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7. Verbal tests contain the following type of items:
   - Information
   - Vocabulary
   - Arithmetic
   - Comprehension
8. 'Intelligence testing' is the test engineered to determine the level of intelligence. In other words it is an estimation of an individual's propensity to gauge the mental ability or capacity through performance in various tasks. These tests are structured to test different types of reasoning.
9. Intelligence tests are conducted in the following ways:
   - Group intelligence tests
   - Individual intelligence tests
   - Computerized tests
10. The two characteristics of personality are as follows:
    - Personality is built by heredity and environment
    - There is individual difference in personality
11. The two important determinants of personality are: (i) Heredity, and (ii) Environment (physical, social and cultural).
12. The two techniques of personality test are: (i) Personality inventory, and (ii) Rating scale.
13. According to Spearman, creativity is the power of the human mind to create new contents by transforming relations and thereby generating new correlates.
14. Tests to measure the creativity are as follows:
    (i) Minnesota tests of creative thinking
    (ii) Guilford's divergent thinking instruments
    (iii) Remote association tests
    (iv) Wallach and Kogan creativity instruments
    (v) A.C. test of creative ability
    (vi) Torrance tests of creative thinking
15. (i) Participatory and
    (ii) Non-participatory observations are two types of observation
16. (i) Observation may give undue stress to aspects of limited significance simply because they can be recorded easily, accurately and objectively.
    (ii) Various observers observing the same event may concentrate on different aspects of a situation.
    (iii) Try to pose and exhibit at the time of observation.
17. (i) Mail or post
    (ii) Face-to-face interview are the modes of getting information through questionnaire.
18. The interview is in a sense, the foundation upon which all other elements rest, for it is the data-gathering phase.

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19. The various types of interview are: (i) Group Interview, (ii) Diagnostic Interview, (iii) Clinical Interview, (iv) Research Interview, (v) Single Interviewer or Panel Interviews, (vi) Directed Interview, (vii) Non-directive, (viii) Focused Interview, (ix) Depth Interview.
20. The tape recorder permits the interviewer to devote full attention to the respondent.
21. An interview permits the research worker to follow-up leads as contrasted with the questionnaire.

7.8 QUESTIONS AND EXERCISES

Short-Answer Questions

1. State the characteristics and types of aptitude.
2. What are the limitations of attitude testing?
3. What are 'group intelligence tests'?
4. State the characteristics of personality.
5. Classify the methods used for assessment of personality.
6. State advantages and disadvantages of projective techniques.
7. What are the characteristics of creativity?
8. What are the characteristics of observation? What are the major problems of observation technique?
9. What are the steps involved in preparing for a research interview?
10. How can questionnaire be put to use?
11. What are the various types of personality?

Long-Answer Questions

1. Explain the various aptitude tests.
2. Describe the various types and methods of measuring interest.
3. Discuss the importance of intelligence tests vis-à-vis education.
4. What are the different types of intelligence tests?
5. Explain how heredity influences personality.
6. Discuss various methods of personality assessment.
7. Write a note on the concept of projective technique.
8. Discuss the various types of observation.
9. Discuss the types of commonly used questionnaires.
10. Describe the various types of interviews.

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UNIT 8 ORGANIZATION OF GUIDANCE AND COUNSELLING SERVICES IN SCHOOLS AND COLLEGES

Structure

8.0 Introduction
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8.2 Guidance Services
- 8.2.1 Characteristics, Nature and Kinds of Guidance
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- 8.2.4 Pupil Information Services
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8.0 INTRODUCTION

Guidance and counselling have become a vital component of higher education, particularly high schools and colleges. The purpose of this is to make education more evocative and focused for the pupil, even though there is no prerequisite of formal guidance and counselling services for pupils in schools and colleges. A variety of aspects are involved for dearth of professional guidance and counselling services that comprise deficiency of resources in colleges and little or no commitment on the part of administrator and management.

A guidance and counselling committee can be set up for the preparation and execution of the programme that can be controlled on the whole by the principal of the respective college. A lecturer in the college who is certified in guidance and counselling can be appointed as the programme manager in the initial phase to chalk out the rationale and framework of the services and identify available resources and physical facilities for the same. A detailed programme structure can be chalked out according to the requirements of the institutions.

Initially, guidance programmes were concerned with the pressing crisis of vocational placement. The intricacies of industrial economy and the impractical aspirations of a large number of young people rendered it vital to establish a mechanism for synchronizing jobs and workers together; vocational guidance became that mechanism. At the same time, counselling associations were set up to help people to be aware of their aptitudes and accountabilities and make wise individual and vocational decisions.

This unit discusses the importance of guidance and counselling services. It also describes the role of a counsellor, principal, career master, parents and teachers during guidance and counselling in schools and colleges.

8.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Define and categorize guidance services
- Explain the significance and role of counselling services
- Give an overview of the roles of a career master, counsellor, headmaster/ principal, teacher and parents

8.2 GUIDANCE SERVICES

Every individual is beset with problems in his life, as a result of which it becomes very difficult for him to achieve satisfactory results without assistance. There is hardly an individual who does not need assistance. There are two sets of differences which are involved in all situations—those among individuals and those among courses of action open to them. There is always a confrontation between needs and opportunities. Thus, there arises a situation of balancing them, which needs assistance. According to Jones, everyone needs assistance at some time in his life; some will need it constantly and throughout their lives, while others need it only at rare intervals at times of great crisis. There always have been, and will continue to be, people with an occasional need for the help of the older or more experienced associates in dealing with such situations.

Life in a primitive society was very simple and so, the process of seeking assistance. Revolutionary changes have taken place in all areas of life and, accordingly the nature of assistance has assumed complexity. In technical terms, assistance is called guidance.

8.2.1 Characteristics, Nature and Kinds of Guidance

The characteristics of guidance are as follows:

1. Guidance is promotion of the growth of an individual in self-direction.
2. Guidance is the process of helping the individual in affecting changes in him.
3. Guidance is helping the individual himself through his own efforts.
4. Guidance is assisting an individual to find his place.
5. Guidance is helping the individual to establish harmonious relationships.
6. Guidance is assisting the individual to adjust himself.
7. Guidance is helping the individual to make appropriate educational, vocational and personal choices.
8. Guidance programme is organized.
9. Guidance programme has a structure, system and personnel.
10. Guidance consists of specialized services—testing, counselling, educational and vocational information, placement and follow up.
11. Guidance programme is an integral part of the school system.
12. Guidance helps an individual to identify and develop his potentialities and talents.
13. Guidance is a point of view that includes a positive attitude towards children.

Kinds of guidance: The different kinds of guidance are as follows:

1. Civic guidance
2. Economic guidance
3. Educational guidance
4. Health guidance
5. Home relations, guidance
6. Leisure and recreational guidance
7. Moral guidance
8. Personal guidance
9. Physical guidance
10. Religious guidance
11. Sex guidance
12. Vocational-or career guidance

Aims of guidance: The aims of guidance are as under:

1. Development of personal potentialities of an individual
2. Assistance in the promotion of the growth of a student in self-direction
3. Assistance in the attainment of self-direction of the student
4. Assistance in the process of learning
5. Assistance in the adjustment of the student
6. Assistance in discovering potentials of the student
7. Assistance in establishing effective relationships in and outside the school
8. Assistance in making educational and vocational choices

8.2.2 Importance of Educational Guidance

One of the chief defects of the present system of education is that the talents of the individuals are not being properly harnessed. Education is not according to the aptitude, ability and interest of an individual. The students are made to read subjects without reference to any goal. Many students are at a loss to understand what subjects to take. They come to a higher secondary school with little or no knowledge of the subjects

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offered. It is unusual to find pupils who know enough about themselves, the courses offered or the relation of school subject to vocational fields to plan the programme that fits them best. Many inappropriate choices are made due to the lack of proper guidance. The parents due to their set notions insist upon taking their children certain subjects which they think to be very useful without caring whether their children possess the required abilities or not. They fail to realize the fact that low ability combined with high ambitions generally leads to inappropriate choices.

There are many cases when students, whose IQs' (Intelligent Quotients) are below 100 take up difficult subjects and fail to pass examinations in spite of their attempts to do so. High ability coupled with a low level of inspiration creates equally serious problems. In the absence of any scientific guidance and counselling, inefficiency, frustration and failure are bound to occur. Our educational institutions are producing misfits on a large scale who are unable to make their lives happier and who fail to contribute their best for society. This leads to a national wastage. 'A student who would have done brilliantly in the humanities may, for want of proper guidance, take up science—or *vice versa* and be put down as a dud, not only in school but even in later life if this results in a wrong choice of career. If the choice had been correctly made, his whole life pattern may have been different,' observes former education secretary, Government of India, K G. Saiyidain.

8.2.3 Where Guidance Should Begin

The more comprehensive view of guidance makes it imperative that guidance should be incorporated in the educational programme beginning with kindergarten'. School guidance work should not be considered chiefly a function of the high and higher secondary schools. It is equally important in the early life of the child.

Guidance at the secondary and the senior secondary stage

One of the main functions of guidance at the secondary and senior secondary levels is to aid in the identification and development of the abilities and interests of adolescent pupils. It helps these pupils to understand their own strengths and limitations and to do scholastic work at the level of their ability; to gain information about educational and vocational opportunities and requirements; to make realistic educational and vocational choices and plan which should be based on a consideration of all relevant factors; and to find solution to their problems of personal and social adjustments in the school and at home. Guidance services also help headmasters and teachers to understand their students as individuals and to create situations in which the students can learn more effectively.

There are two important reasons which give rise to the necessity of a specialized guidance service. The first reason is that there is a marked difference in the curriculum of an elementary and secondary school and that of a higher secondary school. Curriculum of a higher secondary school is a diversified one which involves the problem of selecting subjects in Class XI.

The second reason is that much emphasis is placed upon the vocational point of view. Important decisions are to be made in Class XI and Class XII. In Class XI, the selection of subjects is largely influenced by vocational requirements. Important decisions are taken and help is needed when the students are about to leave the school, either to secure jobs or to go to college or to some other type of further training.

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Aims and purposes of educational guidance at the secondary school level

1. To assist the child in securing information regarding the possibility and desirability of further schooling.
2. To help the child to know the purpose and functions of the different types of schools.
3. To enable him to know in detail the programmes of the school that he might attend.
4. To assist him to know the requirements for entrance into the school of his choice.
5. To help him adjust to the curriculum, the school and the social life connected with it. Under this heading, we may include:
   (a) To help him in the selection of subjects.
   (b) To help in the selection of books for each subject.
   (c) To help him in developing study habits.
   (d) To help him in making satisfactory progress in various school subjects.
   (e) To help him in selecting hobbies
   (f) To help him in the selection of co-curricular activities.
   (g) To help him in knowing the availability of scholarships, loans, etc.
   (h) To help him to find out his tastes, aptitudes and interests.
   (i) To help him to build good social relationships
6. To help him in the selection of a vocation.
7. To acquaint him about the various openings available to him for his career after finishing school.
8. To help him find out his physical, mental and emotional handicaps and then to treat them.

8.2.4 Pupil Information Services

Pupil information services are the four professions of school: counselling, nursing, psychology and social work, systematized in the form of a team with school administration. Eight constituents recapitulate the types of approaches, involvement and programmes that are utilized by pupil services professionals for providing elaborate services needed to support student development in the academics, career and personal/ social areas, as well as address barriers to learning. Precise members of the pupil services team provide these components in tune with their training and individual spheres of skill. These components are given as follows:

1. Evaluation, screening and estimation
2. Individual and small group student services
3. Home-school alliance
4. Classroom tutoring
5. Teamwork and affiliation with society-based systems
6. Services for personnel

7. Programme and resource improvement, administration and assessment
8. Change of systems and course of action

With the help of pupil information services, counsellors help pupils, teachers and parents by identification and provision of suitable programmes customized for individual pupil needs. This is achieved by the use of developmental programmes, evaluation, intercession, discussion and harmonization of services. Counsellors cooperate with parents and teachers to help children achieve behaviour patterns and social/personal abilities that are needed for developing the ability of the children. The counsellor's hard work is aimed at helping students to succeed in the school by imbibing decision-making skills and helping them in tackling daily routine issues that are the integral parts of human growth and development.

Guidance and counselling services are a vital element of the school programme. The objective of guidance and counselling is to supply affordable and accessible support services to every student. It also assists by providing the opportunity to achieve utmost intensification and progress in gaining self-realization, social/personal skills, financial effectiveness, educational merit and civic accountability. Counsellors aid students in categorizing and applying educational and occupational decision making. Information services, scheduling and placement, individual and group assessment, orientation programmes, pupil/parent consultation and group guidance activities are accessible at proper times all through the academic year. Junior and senior level students are delegated to counsellors by grade level and/or in alphabetic order.

8.2.5 Scope of Guidance

The following chart highlights the scope of guidance:

1. Appraisal by means of	(a) Tests and rating scales	
	(b) Parent's ratings	
	(c) Diagnostic records	
	(d) Individual inventories	
	(e) Sociometric analysis	
	(f) Observations	
	(g) Anecdotes	
	(h) Educational clinics	
	(i) Case studies	
	(j) Cumulative records	
2. Adjustment by means of	(a) Change in the environment through	1. Socialized curri-curriculum, 2. Co-curricular activities 3. Physical surroundings 4. Community resources 5. Educational and vocational opportunities 6. Group contacts
	(b) Changes in the individual through exercises	1. Interviews 2. Operations 3. Developmental 4. Instruction 5. Guidance 6. Group process

8.2.6 Vocational Guidance

The concept of vocational guidance is discussed in detail in this section.

Meaning and definition

Vocational guidance would assist an individual in solving the following problems:

- What shall I do in life?
- What am I best fitted for?
- How shall I find out my abilities and capacities?
- Who can guide me in selection of a career?

Vocational guidance is sometimes described as the process of 'fitting round pegs in round holes and square pegs in square holes".

To acquaint ourselves adequately with the concept of guidance, we may go through the following definitions:

1. National Vocational Guidance Association (USA) defines vocational guidance as: 'Vocational guidance is the process of assisting the individual to choose an occupation, prepare for it, enter upon and progress in it. It is concerned primarily with helping individuals make decisions involved in planning a future and building a career—decisions and choices necessary in effecting satisfactory vocational adjustment.
2. The General Conference of International Labour Organization (ILO) in 1949 described vocational guidance as 'assistance given to an individual in solving problems related to occupational choice and progress with due regard for the individual's characteristics and their relation to occupational opportunity'.

To quote Prof. G. E. Myers, 'Vocational guidance is fundamentally an effort to conserve the priceless native capacities of youth and the costly training provided for youth in the schools. It seeks to conserve these richest of all human resources by aiding the individual to invest and use them where they will bring greatest satisfaction and success to himself and greatest benefit to society'.

According to Donald E. Super, 'Vocational guidance is the process of helping a person to develop and accept an integrated and adequate picture of himself, and of his role in the world of work to test this concept against reality and to convert it into a reality with satisfaction to himself and benefit to society'. Super is reorganized for his contribution in vocational guidance and has authored several publications in the field.

Need for an organized programme of vocational guidance

1. **Individual differences:** The basic reason that people need guidance is that each individual is different and has different options available in life—professionally and personally.
2. **Financial point of view of an individual:** It is common for young individuals to choose a profession for the wrong reasons. Eventually, they discover that they are not suitable for the job. This causes financial loss as well as mental trauma. It is also a loss for the organization that has trained the individual, and after they leave, the organization has to recruit and train another individual to take their place. The individual also loses precious time which they could have spent in learning and growing in the right job.
3. **Vocational guidance from the financial point of view of the employers:** Often industry and business incur heavy losses because of change in labour. When an electrician's apprentice decides to leave his job and becomes an automobile mechanic, the new worker takes time to gain proficiency to the point attained by one who has left. The quality and the quantity of work suffer. Besides, the time spent on the selection and appointment of the previous worker is also wasted.
4. **Financial point of view of the society:** The society on the whole also suffers a loss when an individual works in an unsuitable position. The goods and services offered to the society by such disgruntled individuals are obviously of poor quality and lacking in many ways.
5. **Health point of view:** Being stuck in a dissatisfying job is likely to affect adversely the health of the individual because of the mental stress and frustration. Delicate eyesight is injured by work. Sometimes nervous system is shattered by making efforts to maintain a speed of production beyond one's capacity, and so on.
6. **Personal and social values:** When a person chooses a particular kind of employment, he is also indirectly selecting other things associated with that job, such as satisfaction, work-life balance, creativity, personal growth and contribution to society. From all these factors emerges a person's happiness in his occupation. A frustrated and dissatisfied worker is a curse to himself as well as to the society. Failure in an occupation has a great demoralizing effect on an individual. 'Each failure in the experience of a young worker increases the probability of another,' writes Prof. G.E. Myers. Super writes, 'Occupation is not merely a means of earning a livelihood but also a way of life, a social role'.
7. **Utilizing human potentialities:** Just because of lack of opportunities or choosing the incorrect vocation, a lot of genius remains undiscovered in every generation. Vocational guidance helps discover individual genius, which further helps the society grow.
8. **The complex nature of the society:** You already know the country is changing rapidly, in terms of economic, political and social aspects. We require scientists, engineers, technicians, technologists, etc., to man our industrial and commercial establishments. This means that new occupations and professions are emerging every day and the right kinds of people are required to fill these positions. A well-equipped employment service bureau can provide information to students and young professionals about these new opportunities.
9. **Availability of the growing amount of information concerning individuals:** New techniques of analysing an individual's mind and capabilities are leading to more rational and scientific ways of realizing human potential— a factor which is of great assistance to a guidance worker in guiding an individual in the matter of making a choice.

Specific aims of vocational guidance: According to vocational guidance expert A.E. Jones, the specific aims of vocational guidance are as follows:

1. To help a student gather knowledge about the characteristics, functions, duties and rewards of the target group of occupations so that he/she can make an informed choice
2. To help the student identify the abilities, skills, qualifications, etc., required for the target group of occupations
3. To provide an opportunity for students to gather experiences in school, such as through short courses and vocational jobs where a student would learn about conditions of work and if they are mentally equipped to handle them
4. To encourage in a student the understanding that all labour is honourable and deserves respect and recognition and the basis for choice of occupation should be:
   (a) The individual's unique contribution to society
   (b) Pride in the occupation
   (c) Ability for tasks to be completed
5. To equip the student with the ability to make the correct and final choice only after careful consideration and analysis of all the available information
6. To help him understand his own capabilities so that he may make the correct choice of vocation
7. To help financially backward children with funds which they may use for furthering their education and career prospects
8. To provide knowledge to the students about the facilities offered by various educational institutions for vocational training and the requirements for admission to them, the length of training offered and the cost of attendance
9. To equip the student to identify the difference between right and wrong and the strength to stay away from the allure of making easy money through unfair means
10. To equip the worker to adjust emotionally with the work and the colleagues and the environment at the workplace

Common mistakes in choosing a career

J.A. Humphreys and A.E. Traxler, authors of 'guidance services', think that the following mistakes are generally made in choosing a career and the guidance service must help an individual to avoid these mistakes:

1. Selecting an occupation that requires mental ability above that of the student
2. Choosing an occupation that has limited employment potentials
3. Choosing an occupation for which the student does not possess essential skills in school subjects
4. Choosing an occupation for which the required level of skill cannot be attained by the students
5. Choosing an occupation for which the individual does not have the appropriate characteristics of personality
6. Choosing an occupation without the required physical strength and endurance
7. Choosing an occupation because of its glamour
8. Choosing an occupation without giving due attention to its financial aspects
9. Choosing an occupation which is already over flooded
10. Choosing an occupation on the basis of parents' wishes and ambitions.

Methods of educational and vocational guidance

Educational and vocational information may be disseminated through the following techniques:

1. Talks by teachers and visitors
2. Audio-visual aids
3. Visits to work sites, industrial and related establishments
4. Group activities like arts club, music club, world affairs forum, etc.
5. Normal classroom work
6. Career conference

Career conference and orientation service

Career conference technique has been found to be very valuable as a means of supplementing the information given to a group by the counsellor or the class teacher. A number of successful persons explain the vocations in which they work and answer questions about their jobs.

Occupational orientation service should cover the following points:

1. Nature and importance of work
2. Conditions of work
3. Minimum qualifications necessary for receiving training
4. Different aspects of training, the institutions giving training, subjects taught in institutions, cost of training and the financial aids—both private and government

The duration of the conference may be one day or more. In planning a conference, the school counsellor will seek the co-operation of both teachers and the students. The students of the higher secondary classes and their parents should be invited to attend such conferences.

Conferences should not be treated merely as a show work.

Sufficient care should be taken in the selection of the speakers who will explain the problems connected with particular occupations. Speakers selected should be those who can explain very clearly their viewpoints to the students and who place occupations in their true perspective. It is better if they are given certain outlines which they should keep in view while preparing their talks.

In between different speeches, some occupational or educational films may be shown to the audience.

An exhibition containing charts which throw light on careers and courses may be organized on this occasion.

8.2.7 Orientation Services

It is very tough to decide to choose a career. In case of the youth, career choices must be well thought-out as early as the school stage and before going to college for many. During such an early age, this is a taxing decision for immature adults and one in which parents are generally intricately involved.

Adult career change over is becoming more and more common with a large number of adults involved in various careers in the period of their work. Adults can find these movements particularly challenging with respect to monetary and family responsibilities, in addition to the aspiration to find contentment in the selection of career.

In order to have a meaningful, engaging career, we have to bring our interests, talents and passions together in a productive, engaging vision. Helping youth and adults understand their character is essential to the process of selecting the right career. Career choices that align with a person's character profile provide the greatest level of job satisfaction, less personal stress and the most effective channeling of energy into productive activities.

8.2.8 Educational Services

Educational services can be classified into five components:

1. Primary education services
2. Secondary education services
3. Higher education services (i.e., education further than secondary education comprises all tertiary education)
4. Adult education
5. Other education services (e.g., liberal arts, business, professional)

Such education and training includes degree courses undertaken for college or university certification or non-degree courses taken for personal upgrade or learning, or for advancement of work-related skills. Such education and training services can be provided in conventional set up of institutions, like universities, schools and in institutes of specialty training.

8.2.9 Occupational Information Services

Occupational information services are a necessity in the following cases:

1. When you are beginning to plan your career
2. In the case of desire to change one's current job
3. At the time of looking for a new line of work
4. When deciding to get trained in a new line of work, because you feel that your current line of work may be outdated after a few years

In such scenarios, you will want to know the maximum that you can about occupations, so as to help you in making good decisions and take the correct direction in the path of your career or job search.

An occupation is not the same as a job. It is a particular type of work that has several similar jobs in it. To be employed in a specific occupation, one needs specialized training, skills and knowledge.

Occupational information services are helpful in providing more learning about certain occupations, inclusive of the following:

- Your likes about working in this domain
- The type of work of your daily routine
- The type of work that is suitable to you
- The type of training or education required
- Potential job trends, prospects and demands
- Industries to look for, in terms of a specific job
- Probable earnings in terms of salaries and wages
- The hiring criteria of companies or industries
- Working norms and environment of specific companies or industries

8.2.10 Placement and Follow-Up Services

Placement services are provided by an establishment that brings together employers and employees. In every developed country, there is an employment agency that provides placement services. This agency gets its funds from the public and many private businesses that also work as employment agencies.

A placement services firm is focused on hiring of executive personnel for firms in a variety of industries. The term 'placement' may be applicable to job-search-consulting firms that charge candidates a fee and specialize in middle to top-level managers. In some countries like the US, a few states make it mandatory for job-search-consulting firms to be certified as employment agencies.

There are other third-party recruitment agencies that work independently, while others are licensed through agencies and work as direct contact between client firms and the candidates to be recruited. They can be dedicated to client liaisons only (sales or business development), in searching for candidates (employment or sourcing), or in both spheres. The majority of recruiters have a tendency to focus on in either long-term, full-time, direct-hire positions or in contract positions, but rarely in more than one. In an executive-search task, the client company that gets an employee and not the candidate being hired, pays the placement firm its fee.

The process of placement is followed by the placement agencies maintaining regular contact with the placed candidates to help them feel comfortable during the transition period. This is known as follow-up service.

The fundamental objectives of follow-up services are as follows:

1. To help the placement agency in realizing the educational, occupational or individual fine-tuning of the students or individuals.
2. A company can keep its new employees and collect necessary information related to their experience, to use it for their mutual benefit.
3. It is with the help of follow-up service that the employee and the employer can achieve the aims and objectives of the company.
4. It helps to modify the company's strategies according to the needs of the present industry scenario.
5. It helps in finding out the extent to which employees have taken the right decisions and the levels of training they have received in the occupation of their choices.
6. Follow-up service is helpful in finding out the job opportunities in hand, within the community, for freshers and prepares them for such jobs.
7. This programme offers such work-related statistics to students that will help them for incorporating modifications to their occupation.
8. It can determine changes in the work-related interests of the employees.
9. Follow-up service can be used for motivating employees who are dejected after placement. It may also help the students in finding either the right job or in changing their current job.

8.2.11 Guidance Services in the School

Guidance services in the school should have the following aspects:

1. Individual inventory service

Compilation of individual inventor giving detailed information about each student concerning his abilities and achievements in different areas is the first essential of every guidance service in the school. This information should be kept up-to-date and used for the good of the student. It may be compiled in the form of a cumulative record.

2. Information service

Students of higher secondary schools generally need three types of information which is very helpful to them in making decisions about various courses, occupations and institutions such as: (a) information about colleges and training opportunities, (b) information about available occupations, and (c) information about scholarships and other financial help available during the training period. Information may be collected from papers and magazines, government notifications and bulletins and information centres of the Employment Exchanges, etc. The usefulness of this information will be lost if the information is not up-to-date. This information may be supplemented by talks of people from different occupations.

Check Your Progress

1. List any two characteristics of guidance.
2. State one of the main functions of guidance.
3. What points should be covered by occupational orientation service?
4. In what cases are occupational information services a necessity?

NOTES

8.3 COUNSELLING SERVICE

Counselling service is regarded as the heart of the guidance programme. This service must assist an individual in identifying, understanding and solving problems that confront him. Counselling can be done by a well-trained counsellor.

Jones observes, 'Guidance is not something that can be separated from the general life of the school, nor is it something that can be located only in some particular part of the school, it cannot be tucked away in the office of the counsellor or in the employment bureau. It is a part of every school activity; some form of guidance is the duty and the responsibility of every teacher in the system. It is, then, a function that is shared by all and should be so administered'.

Meaning of counselling

According to American psychologist Carl Rogers, 'Counselling is a series of direct contacts with the individual which aims to offer him assistance in changing his attitudes and behaviour'.

Guidance and counselling experts Hahn and Maclean are of the opinion that clinical counselling is a process which takes place in a one-to-one relationship between an individual troubled by personal problems with which he has been unable to cope alone and a professional worker whose training and experience have qualified him to aid others to reach solutions to various types of personal difficulties.

Canadian counsellor Donald Arbuckle thinks that counselling has the following two elements:

1. It involves two persons.
2. Its objective is to assist the student or the counselee to solve his problems independently.

Difference between guidance and counselling

Guidance and counselling are not synonymous terms. Counselling is a part of guidance, not all of it. G.E. Smith writes, 'The concept of counselling as a group of services which make up the guidance programme is generally accepted'. Similarly, the two terms, counselling and interview, are not interchangeable. Interview is a face-to-face discussion between the counsellor and the counselee. Counselling can be given through correspondence and the telephone conversations. Counselling is a wider term which includes interview as one of its techniques.

When counselling is required

According to Miss Bragdon, following types of situations call for counselling:

1. When a student needs not only reliable information but also an interpretation of such information as meets his own personal difficulties
2. When a student needs a wise listener with a broader experience than his own, to whom he can recount his difficulties and from he may gel suggestions
3. When a student thinks that the counsellor has access to facilities for acting in the solution of his problem and the student does not have easy access to those
4. When the student is aware of the problem but is unable to define it
5. When a student is aware of the problem but because of a temporary strain and distraction, he is unable to cope with it intelligently

NOTES

Role of the counsellor

The counsellor serves pupils' needs by:

1. Assisting pupils to understand themselves and their social and psychological world
2. Helping pupils develop their aptitudes, abilities, interests and opportunities for self-fulfillment
3. Helping pupils develop decision-making competency
4. Helping all staff members understand individual pupils by providing material information and evaluations
5. Determining the impact of the school programme on pupil development and conveying that information to staff members
6. Informing staff members of significant changes in the school and non-school environment which have implications for instruction
7. Assisting parents to understand the developmental needs and progress of their children
8. Informing the community of the importance of considering the individual and interpreting the role of counselling in such consideration
9. Promoting non-school developmental opportunities in the community for children
10. Developing and/or using community resources for meeting this unusual or extreme needs of pupils

Counselling interview

It is one of the important techniques in counselling. American education expert Ruth Mary Strang describes the interview as the heart of the counselling process to which other techniques are contributory. In the words of Erickson, 'A counselling interview is a person-to-person relationship in which one individual with problems and needs turns to another person for assistance'. The essential feature of the interview is a dynamic face-to-face relationship in which the counselee is helped to develop insights that lead to self-realization. According to the same author, there is a wide variety of interviews ranging from a short conversation in which a student's need for information is quickly met, to a long series of psychotherapeutic interviews.

8.3.1 Career Talk and Career Corners

Career talk is a career mentoring programme. It is aimed at freshers, who are at the beginning of their career and other seasoned professionals who are looking for growth opportunities. A large number of articles have been written with an academic focus, the majority of them apply to specialized development in any line of work. Career talk aims at defining the values and expectations that are crucial for individuals to succeed both personally and professionally, make the reader aware of likely downsides along

the way and also talk about approaches to find the way through these problems. Career talk also aids individuals in getting the information they need to proactively handle and negotiate their career.

Career corners provide members and non-members with prospects to post job openings within their companies or provide job seeking candidates with opportunities to know about the positions are available. Careers corners are established by regional employment exchanges to help students of higher studies by catering to their job-related queries. Career corners work in synchronization with the secondary education department in a variety of government aided schools. A teacher from the school is appointed as a career master who guides students concerning their career and resolves their queries. The employment exchange office provides assistance by obtaining all the information regarding recruitment process and training programmes. With the help of these career corners, students can also get to know about the different types of schemes launched by the government, educational loans, training for SC/ST and OBC students and others.

8.3.2 Role of Career Master, Counsellor, Headmaster/Principal, Teacher and Parents

A career master is a person who gives advice and information about careers to his or her students/candidates. Since planning for a career begins right from the school days, here we will focus on the role of a teacher as a career master.

(a) Role of a career master

Even though every teacher has some responsibility of guidance, not every one of them is appointed as a career master or teacher counsellor to provide minimum guidance service and to help as a fulltime guidance counsellor.

Career masters are elected from among the best secondary school teachers who are trained intensively to discuss pressing problems and new occurrences in their administrative work.

The duties of a career master can be summarized as follows:

1. To understand the mindset of children.
2. Talk about on endeavours and purposes of guidance programmes.
3. Assist in the issues of discipline.
4. Set up guidance services in schools.
5. Establish career conferences.
6. Arrange for extracurricular activities.
7. Set up vocational centres.
8. Maintain school records.
9. Select suitable career-related materials.
10. The career master should know the category of counselee and his requirement.
11. Validate occupational information.
12. Know the sources of information.
13. Collect and preserve information.
14. Know and understand the hierarchy of needs.

The career master should have knowledge about Maslow's Hierarchy of Needs, which comprise the following:

(i) Physiological needs
(ii) Safety needs
(iii) Need for belongingness and love
(iv) Need for importance, respect, self-esteem and independence
(v) Need for information
(vi) Need for understanding
(vii) Need for beauty
(viii) Need for self-actualization

(b) Role of a counsellor

A career counsellor is a significant person in the occupation force, particularly in educational institutions. This person plays a major role in helping individuals use their talents well in their jobs and helps them in the process of applying for colleges. There are a lot of responsibilities and duties that are taken up by a career counsellor daily.

Career counsellors have precise jobs and responsibilities, which go along with their position. In addition to providing counselling to students, the career counsellor must also be in contact with external agencies like business heads, parents, teachers and school managers to sufficiently accomplish their role as career counsellor. Career counsellors keep comprehensive files on every student that they are in touch with and evaluate the files during follow-up meetings with the students.

(c) Role of headmaster/principal, teacher and parents

The planning and execution of a school programme is made possible by the cooperative efforts of the head of the institution, teachers, students and their parents. All have to work together to attain common goals and purposes. The headmaster may be depicted as the hub, around whom all the teachers revolve.

W. M. Ryburn has compared the headmaster with the captain of a ship, who holds a crucial place in the school. Ryburn visualizes a headmaster to be a person of faith. It is, hence, important for him also be an honourable man. The faith he should have can be understood as faith in occupation, faith in his students, faith in human character and faith in his personnel.

A headmaster has to perform diverse duties. These can be classified expediently into the following:

1. Teaching
2. Planning
3. Organization and administration
4. Supervision

The role of the principal encompasses several zone including leadership, teacher assessment, pupil discipline, and quite a few others. Being an effectual principal is a laborious and slow process. A good principal is unbiased within every role and makes efforts to ascertain that he is doing what he feels is best for all elements involved.

The role played by a teacher in the educational establishment is very crucial. It is a two-way process, i.e., pupil and teacher, i.e., two faces of one coin. There is no doubt that a teacher is the lifeline of the social order, nation and the educational system. A teacher is a representation of the entire society in a school, which is a part of the society or a mini society. He is responsible for making his pupils the citizens of tomorrow and the future of the country.

Teachers plays a significant role in various competencies. They perform as the director of the school/student and give out instructions and directives in a way that cannot be mended. Students receive instructions from them directly and they introduce different methods to direct the students, for instance, co-curricular activities and extracurricular activities in the schools.

Teachers are also a part of the organizational hierarchy of the school. As such, they are significant for the organization of the school, activities of the school and for bringing about transitional, etc. In fact, they are the administrators of the school, classes and management. Given that, students are the prime objective in the entire, educational system, they need a competent administrator, planner and teacher as the person to whom everybody looks up.

Raising a child is a full-time task and parents are the key route-finders of their children's growth. His/her development is regulated mainly at home and in school, and when both of these setting are in sync with each other, the child benefits the most. Working in synchronization with schools will help us understand the needs and progress of our children in a better way, so that we may give them the needed family care, support and encouragement at home.

The dynamic contribution of both parents and teachers is what makes home-school teamwork such a trouble-free, yet imperative and powerful perception. Many studies have associated home-school collaboration to improved learning, strong self-worth, more optimistic attitude and performance in life. A child's development on the both the tracks of home and school will help make the most of his/her ability in life.

8.3.3 Career Tours

Career tours facilitate pupils to get an authentic insight into a prospective occupation and employment. With the help of these tours, pupils are journeyed to the sites of companies so that they can visualize and know the actual happenings. This helps them in making more enlightened career decisions.

A picture is worth a thousand words and there is no better way to learn about business practices, requirements, prospects and challenges than to visit a place of work and talk to the professionals. By seeing a happening workplace, pupils and teachers can learn more about business actualities, the careers in hand and the alternatives for them. Businesses host worksites tours for both, pupils and teachers. Tours are of one or two hours duration and comprise a synopsis of the business, a travel around the workplace involving up to 12 employees, a chance to hear from employees and a chance to ask questions.

Check Your Progress

5. How does Carl Rogers define counselling?
6. According to Donald Arbuckle, which two elements does counselling have?
7. What is career talk?
8. Briefly describe the role of a career counsellor.

8.4 SUMMARY

In this unit, you have learnt that:

- There are various types of guidance services available to those who are either in school or on their way to take up a career.
- The main basis for guidance offices is to provide benefits to pupils who need help with academic or personal challenges and also help to guide them correctly, when applying for jobs.
- They can also help those with extraordinary knowledge requirements and set up strategies to help students be successful in every phase of their educational life.
- Career counselling, career guidance and career coaching are alike in character to other types of counselling or coaching, e.g., matrimony or emotional counselling. What brings all types of professional counselling together is the function of professionals, who merge providing guidance on their theme of proficiency with counselling methods that support customers in making difficult decisions and dealing with tricky state of affairs.
- The hub of career counselling is usually on problems such as career tour, career transformation, personal career advancement and other career-related issues.

8.5 KEY TERMS

- **Vocation:** It is a type of work or way of life that you believe is especially suitable for you.
- **Unanimity:** It refers to a complete agreement about something among a group of people.
- **Academic guidance:** It is a series of intentional interactions with a curriculum, a pedagogy and a set of student learning outcome.
- **Co-curricular:** These are activities that are outside the regular curriculum of the university or school board.
- **Sociometry:** It is the quantitative study of social relationships.
- **Audio-visual aids:** These are materials that provide pictures and/or sounds to assist learning or teaching.
- **Orientation:** It is a program of introduction for students who are new to a school or college or employees to a new organization.

8.6 ANSWERS TO 'CHECK YOUR PROGRESS'

1. The characteristics of guidance are as follows:
   (i) Guidance is helping the individual to make appropriate educational, vocational and personal choices.
   (ii) Guidance helps an individual to identify and develop his potentialities and talents.

2. One of the main functions of guidance at the secondary and senior secondary levels is to aid in the identification and development of the abilities and interests of adolescent pupils.
3. Occupational orientation service should cover the following points:
   (i) Nature and importance of work
   (ii) Conditions of work
   (iii) Minimum qualifications necessary for receiving training
   (iv) Different aspects of training, the institutions giving training, subjects taught in institutions, cost of training and the financial aids both private and government
4. Occupational information services are a necessity in the following cases:
   (i) When you are beginning to plan your career
   (ii) In the case of desire to change one's current job
   (iii) At the time of looking for a new line of work
   (iv) When deciding to get trained in a new line of work, because you feel that your current line of work may be outdated after a few years
5. According to Carl Rogers, counselling is a series of direct contacts with the individual which aims to offer him assistance in changing his attitudes and behaviour.
6. Donald Arbuckle thinks that counselling has the following two elements:
   (i) It involves two persons.
   (ii) Its objective is to assist the student or the counselee solve his problems independently.
7. Career talk is a career mentoring programme. It is aimed at freshers who are at the beginning of their career and other seasoned professionals who are looking for growth opportunities.
8. A career counsellor is a significant person in the occupation force, particularly in educational institutions. This person plays a major role in helping individuals use their talents well in their jobs and helps them in the process of applying for colleges. There are a lot of responsibilities and duties that are taken up by a career counsellor daily.

8.7 QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write short notes on:
   (i) Individual differences and guidance
   (ii) Types of guidance
   (iii) Basic principles of guidance
   (iv) Benefits of guidance
   (v) Career conference
   (vi) Counselling

2. List the different types of guidance.
3. What are the aims of guidance?
4. What is the need for an organized programme of vocational guidance?
5. Name the five components of educational services.

Long-Answer Questions

1. 'Guidance is as old as man himself'. Discuss this statement and point out the importance of guidance in the modern times.
2. Explain the aims of educational guidance. What is its scope?
3. Elucidate the statement: 'In its final analysis, all guidance is vocational.'
4. It is said that at 'the secondary stage of schooling, educational and vocational guidance are inseparable'. What is your point of view?
5. 'Educational and vocational guidance is the backbone of the educational system.' Explain this statement.
6. What are the factors that should be considered while choosing a subject or a vocation? State the role of guidance.
7. Elucidate the types of guidance services that a senior secondary school should provide to its students.

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