MAEDN-402
Educational Psychology: Growth and Development

MA EDUCATION
1st Semester

Educational Psychology: Growth and Development

MA [Education]

First Semester

MAEDN 402

RAJIV GANDHI UNIVERSITY

Arunachal Pradesh, INDIA – 791112

Authors

Dr. C Siva Sankar
Moyir Riba

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 year 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 Comission 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 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 improvements. 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 Academy 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 per 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 counsellig in the form of personal contact programmes 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 Instructions 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 counseling-Coordinators do necessary coordination for involving resource persons in contact and counseling programme and assignemt evaluation.The learners can also contact them for clarifying their difficulties in then respective subjects.

SYLLABUS

Objectives:
1.   To enable learners understand the relationship between psychology and education
2.   To enable learners analyze various methods of educational psychology
3.   To enable learners understand growth and development of the child

Course Content:

UNIT-   I. **Psychology and Education:**
-       Nature, scope and concept of educational psychology
-       Schools of psychology and their contributions to Education; Structuralism, Functionalism Gestalt, Constructivism.

UNIT- II. **Methods of Educational Psychology:**
-       Experimental Method
-       Differential Method
-       Clinical Method
-       Observation Method.

UNIT- III. **Growth and Development:**
-       Dimensions of growth and development; Physical, Social, Emotional, Language development with special reference to Adolescence period.
-       Factors of growth and development: Heredity and environment and their implication on education.
-       Developmental task during Adolescence period

Practical

Unit-IV. **Experiment**
-       Fatigue (Effect of responses, attention distraction)
-       Mirror Drawing

Practicum
1. Case study of a problem child

CONTENTS

INTRODUCTION

No teacher can teach effectively without trying to understand the psychology of proper instruction. Each student has and individual set of characteristics that influence his ability to comprehend, register and process information. Also, the effectiveness of teaching is influenced by the assessment techniques and the school's overall environment, rules and attitude with regard to tests. The style and method used to teach are greatly affected by the background and experience of the teacher. The manner of teaching, in turn, greatly influences the way the student is shaped and prepared to take on future challenges.

This book, Psychology of Learning and Development, deals with all the psychological aspects of teaching. It discuss the biological, behavioural, cognitive, humanistic and psychoanalytical schools of psychology. The book also throws light on the importance of educational psychology. It, in general, discusses the general principles of growth and development, the stages of development, the theories of child development and the dimensions of adolescent development. Cognitive development and the cognitive process have been discussed with emphasis on attention, inattention, distraction and sensation. Thorndike's laws and the theories of learning, factors influencing the process of learning, the learning curve, theories of intelligence, multiple intelligence, Guilford's structure of the intellect and emotional intelligence are some other important topics covered in this book. The book also discusses the theories of personality, along with the concepts of mental health, conflict, frustration, adjustment and defence mechanisms in detail.

The book has been divided into eight units:

Unit 1 Psychology and Education

Unit 2 Methods of Educational Psychology

Unit 3 Growth and Development

Unit 4 Experiments

UNIT 1 PSYCHOLOGY AND EDUCATION

Structure

1.0 INTRODUCTION

Educational Psychology involves the study of how people learn, including concepts such as student outcomes, instructional process, individual differences in learning and learning disabilities. Educational Psychology is one of the many branches of psychology dealing mainly with the problems, processes and products of education.

It is an attempt to apply the knowledge of psychology in the field of education. In this we try to study human behavior, particularly the behaviour of the learner in relation to his/her educational environment. This branch of psychology involves not just the learning process of early childhood and adolescence, but includes the social, emotional and cognitive process that are involved in learning throughout the entire lifespan. The field of educational psychology incorporates a number of other disciplines, including development at psychology, behavioural psychology and cognitive psychology. In other words, educational psychology may be defined as that branch of psychology that studies the behaviour of the learner in relation to his educational needs and his environment. Educational psychology has been defined by various psychologists and scholars.

In this unit, we will be discussing the nature, scope and concept of educational psychology and about the different schools of psychology and their contribution in the field of education.

1.1 UNIT OBJECTIVES

After going through this unit, you will be able to :
- Discuss the meaning, nature and scope of psychology
- Describe the features of different schools of psychology and the various methods of psychology
- Identify the various branches of psychology
- Discuss the meaning and importance of educational psychology

1.2 CONCEPTS, DEFINITIONS AND NATURE OF PSYCHOLOGY

Psychology is derived from Greek words 'psyche' and 'logia' which together imply the 'study of the human mind'. Like many other subjects, psychology finds its roots in ancient philosophy. Its subject matter has evolved from the study of soul and mind.

Psychology is now identified as the scientific study of human and animal behavior. Behaviour is the way one acts in a given situation. Behaviour includes the actual actions and responses of organisms, both animals and human beings. According to Woodworth, 'any manifestation of life is activity and behaviour is a collective name for all these activities.' Total behavior includes both covert and overt activities.'Over behavior' is that behavior which can be observed and measured, and 'covert behavior' is that behavior which includes our inner experiences and those mental activities that are going on in the brain.

Definitions of Psychology

Important definitions of psychology are as follows:

- **John. B. Watson:** 'Psychology is that division of natural science which has human behavior-the doing and saying, both learned and unlearned-as its subject matter.'
- **William James:** 'Psychology is the science of mental life, both of its phenomenon and of their conditions…. The phenomena are such things as we call feelings, desires, cognitions, reasonings, decision and the like.'
- **Kenneth Clark and George Miller:** 'Psychology is usually defined as the scientific study of behavior. Its subject matter includes behavioural processes that are observable such as gestures, speech and physiological changes and processes that can only be inferred such as thoughts and dreams.'
- **R.S. Woodsworth:** 'Psychology is the scientific study of the activities of individual in relation to his environment.'
- **R.H. Thouless :** 'Psychology is the positive science of experienced behavior.'
- **Jalota:** 'Psychology is defined as the study of mental processes as experienced in bodily behavior of observed in direct behavior.'
- **Gardener Murphy:** 'Psychology is the science that studies the responses which living individuals make to their environment.'

Nature of Psychology

Psychology has certain characteristics which make it a science. These characteristics are as follows :

- **Psychology uses scientific methods:** Psychologists conduct experiments in strictly controlled conditions. Psychological laboratories are used to observe any phenomenon to establish cause-and-effect relationship.
- **Psychology is factual:** It is not based on values but facts. Psychological information is based on observation and experiments.
- **Psychology is verifiable:** Most of the psychological principles can be verified by researchers by using scientific methods.
- **Cause-Effect relationship:** It is the characteristic of science to establish cause-effect relationship and derive universal principles for generalization. Psychology also tries to develop cause-end-effect relationship between different variables under study and then formulate theories based on the findings.
- **Laws of psychology are universal :** The laws of psychology are considered to be universal in their application. These laws are applicable to all organisms at all times under similar conditions.
- **Psychology can predict human behaviour :** By discovering the cause-effect relationship, psychologists can predict human behavior. Many psychological tests are conducted to predict the behavior.

1.3 SCOPE, BRANCHES AND APPLICATIONS OF PSYCHOLOGY

Psychology has mainly been interpreted as 'the study of behaviour' for centuries, but scholars are interested in knowing what are the various fields which psychologists like to explore. Some of these areas are as follows:

- **Physiological psychologists :** Physiological psychology is that science which studies the biological bases of behavior. Physiological psychologists want to explore the relationship between body processes and behavior. For example, what is the effect of certain drugs on memory?

- **Developmental psychologists :** Developmental psychologists can study human growth, they lay stress on factors that shape human behavior from birth to old age. Psychologists try to study how development occurs when there is a gradual accumulation of knowledge.

- **Experimental psychologists :** Experimental psychologists use experimental method to study behaviour. Experimental psychology involves the collection of reliable and quantifiable behavioural data.

- **Clinical and counseling psychologists :** Clinical and couselling psychologists deal with diagnosis and treatment of mental and emotional problems like drug addiction, juvenline delinquency and criminal behaviour.

- **Industrial psychologists :** Industrial psychologists are broadly concerned with human factors in industry. They try to improve quality of work life by addressing issues like justice at workplace, balancing roles at work and at home.
- **Personality and social psychologists :** Social psychologists are concerned with the behaviour of people in groups. Personality and social psychology emphasizes to concentrate on basic questions regarding people and their sensations, perceptions and attitude.

  Social psychologists use scientific methods to analyse social interactions and how thoughts, feelings, and behaviours of individuals are influenced by other people.

- School and educational psychologists : These days most of the schools offer students the facilities of a trained educational psychologist because the adolescents come across many types of emotional and career problems during this phase of their life.

1.3.1 Branches of Psychology

There are many branches of psychology such as :

- **General Psychology:** This branch of psychology deals with theories and principles related to the behaviour of normal human beings. General psychology studies different aspects of mind as perception, cognition, emotion, and behaviour.
- **Abnormal Psychology:** The subject matter of this branch of psychology is the study of various forms of abnormal behaviour, and its treatment through various psychological techniques. Abnormal psychology is scientific study of many psychological disorders.
- **Child Psychology:** This branch of psychology studies the growth and development of a child from birth to adolescence. It studies the behaviour of children with special needs. Child psychologists deal with knowledge on development of child which includes physical,mental and emotional growth.
- **Animal Psychology:** In this branch of psychology, the animal behaviour is the studied under controlled conditions.
- **Environmental Psychology:** This branch of psychology refers to role of environment on behaviour. The psychologists lay emphasis on modifying and restructuring environment for social well-being.
- **Sports Psychology:** This branch of psychology studies the behaviour of players and sport persons. The main aim of sports psychologists is to improve the performance of players by minimizing the psychological effects of injury and poor performance and by managing their emotions.
- **Aerospace Psychology:** Aerospace psychology deals with the behaviour of astronauts who go to space. Aerospace psychologists try to design training programmes for the astronauts so that they can adapt their behaviour according to the new environmental settings and are in sound mental health.
- **Military Psychology:** This branch of psychology is related to the behaviour of soldiers working in the armed forces. The main area of concern for the military psychologists is how the stress level of the soldiers can be reduced and their morale can be kept high.
- **Consumer Psychology:** This branch of psychology deals with the behaviour of consumers in their present economic situation and social status. The area of interest is to find out the needs of the customers and their expectations from the product. This branch of psychology is designed to benefit the sales persons.
- **Psychometrics:** This branch of psychology is concerned with the construction of psychological tests for measuring and analyzing different aspects of behaviour.
- **Folk Psychology:** It is the branch of psychology which aims to study the culture, art, religion, superstitions and other such aspects. This branch of psychology is gaining more prominence in the developed countries.
- **Organizational and Managerial Psychology:** This branch of psychology studies the behaviour of human resources in the organization. By studying this branch, psychologists can help the managers working in the organizations in maintaining their zeal and enthusiasm for exercising their duties properly, cooperatively by seeking proper satisfaction and adjustment in their work environment.

1.3.2 Relationship of Psychology with Other Fields of Study

- **Psychology and economics:** Economics is the study of man's activities devoted to obtaining the material means for satisfaction of his wants. Thus, it can easily be concluded from the above definitions that economics studies some activities of human beings; on the other hand, psychology also studies human activities.

Many economic problems have a psychological aspect, for example, problems of strikes, lockout, advertisements and propaganda, working conditions can be solved by psychological interventions.

Principles of demand and supply and law of marginal utility are also related to human interactions which form an important part of psychology.

- **Psychology and political science:** Political science studies political institutions, working of government laws etc. Social psychology studies the behaviour of individuals in society. The laws cannot be made without understanding the psychology of people.

- **Psychology and sociology:** Sociology is scientific study of society. Sociology studies man in the context of society and as a part of it. According to MacIver, sociology gives aid to psychology. In order to understand group behaviour in sociology, it is important to study individual behaviour.

- **Psychology and biology:** Behaviour is related to man's interaction with environment. Darwin's theory of evolution is based on biological theories. Behaviour is related to external as well as internal feelings. The human behaviour and animal behaviour cannot be explained without the help of biological principles.

- **Psychology and philosophy:** History of psychology reveals that psychology was considered the study of mind. Mind is a philosophical term. Mental concepts like deep sleep, dreams are all a part of philosophical discussions, but its logical explanations are based on the psychological theories given by Freud.

1.3.3 Application of Psychology

Applications of psychology include several important areas, such as:

- **Education:**Psychology has a very important role to play in the field of education. Psychologists work in schools and universities to guide students in their educational and vocational problems. They also work to solve problems of adjustment. Conducting aptitude, intelligence and personality tests is a part of their counselling sessions.The psychologists working in schools also help teachers in developing skills in solving classroom problems and develop and improve teachings methods to increase class effectiveness.

  Some students are unique and require special teaching assistance. Psychologists also help in designing programmes for such special children.

- **Criminiology:** Forensic psychology deals with a lot of practices that mostly include medical evalutions of defendants, statements given to judges, and courtroom testimony. Rehabilitation of criminals also involves psychologists.

- **Therapy:** Psychology has been proved to be very useful in treatment of diseases. The cause of many diseases is psychological, and hence requires psychological treatment. It has been found by many studies that 10 per cent of the American population at one time or another suffer from some mental problem.

  It is commony said that every human being at some point of time requires the guidance of a clinical psychologist. Psychologists conduct many types of therapeutic sessions on the patients suffering from psychological problems like neurosis, anxiety and phobia. This branch of psychology is called 'abnormal psychology'.

- **Trade:** One important area related to industry is advertisement. Psychology has made selling an art. Psychologists understand the interest and percepting of customers and help in creating the advertisements, while keeping in mind the needs of buyers.

- **Recruitment:** Psychology has helped the organizations in finding out suitable men for different kinds of work. Psychologists are also a part of interview boards to judge the different aspects of the personality of the candidates appearing for the interview.

- **Self-understanding:** Psychology helps in understanding the self – the more you know, and find out about yourself, your personality and your faults; the more are the chances of self improvement. Self-understanding is the way to self control, and thus a person becomes more self-confident. Understanding hidden self, unconscious part of personality, Freud's analysis of dreams is another important contribution of psychologists in this direction.

- **Politics:** Psychology has been widely used in political science. It has become very important for the politicians to understand the psychology of public to remain in power. Leadership is also very crucial discipline of psychology. Various theories and practices of leaders are discussed in this psychology.\

- **Communication:** Psychology not only helps in improving communication skills but also improves relationship by understanding others. Psychology also emphasizes the importance of non-verbal communication by understanding gestures, posture and body language to communicate better.

- **Military science:** Psychology helps in selection, training, promotion and classification of military personnel. Psychology also helps in knowing the current level of mental status. It also tries to bring modifications and corrections in the environmental situations and work conditions of the defence personnel after analyzing the need. Psychology also helps in the time of war by designing techniques to keep the morale of the soldiers high. Psychologists also try to make the defence personnel capable of handling the stress.
- **World peace and brotherhood:** The reasons for war, conflict and fights is that the people fail to understand the behaviour of other people. Psychology helps in understanding the different aspects of behaviour, and analyse the causes of different types of peculiar behaviour and the situations that lead to this behaviour. Psychological techniques can also be helpful in bulding mutual trust and a feeling of brotherhood.

1.3.4 Scope of Educational Psychology

Educational psychology is the application of psychological findings in the field of education. It is the systematic study of the development of the individual within the educational settings. Educational psychology helps the teacher to transform a student into a responsible and participating citizen; a sensitive and reflective human being; and a productive and creative person.

Caroll (1965) defined educational psychology as 'the study of school learning in all its aspects'. Klousmier *et al.*, (1975) suggest that it is the science that studies the student behaviour in educational settings. Student behaviour and the educational process set the boundaries of its content and methodology. Gage (1967) opined that educational psychology should deal with the psychology of different methods of teaching. Characteristics of learners and the conduct of teachers.

Judd describes educational psychology as 'a scientific study of the life stages in the development of an individual from the time he is born until he becomes an adult'.

Educational psychology is applied to the educative process from birth to death of an individual. Lindgren (1976) has pointed out that there are three elements or focal areas in education that concern educational psychologists and teachers. These are as follows:

(i)   The Learner: The learner is the most important of the three elements, not only because people are more important than processes of situations, but primarily because without the learner, there is no learning. A great deal of what happens in the classroom (or is expected to happen) can be explained in terms of the personalities of students, individual differences, developmental characteristics, mental health, intelligence and psychological problems of students.

(ii)   The Learning Process: By learning process, we meant whatever people do when they learn. What they learn. What they 'do' includes behaviour that is not directly observable, such as perceiving, thinking, remembering and identifying; as well as the behaviour that can be directly observed, such as writing, computing, attending and talking.

(iii)   The Learning Situation: It refers to the environment in which the learner finds himself/herself, and in which the learning process takes place. It includes factors or conditions that affect the learner and the learnin process. The teacher is one element and another is the classroom setting (ventilation, light, nose and arrangements of seats, etc.)

1.3.5 Importance of Educational Psychology for the Teacher

Educational psychology helps the teacher in the following ways:

Contribution to theory of education

- *Better understanding of development characteristics:* Children pass through different stages of development, such as infancy, childhood and adolescence, These developmental stages have their own characteristics. If the prospective teacher knows the characteristics of learners emerging at different stages of development, he/she

can utilize these characteristics in imparting instructions and moulding their behaviour according to the specified goals of education.

- *Knowledge of the nature of classroom learning:* The knowledge of educational psychology provides a teacher the knowledge of learning process in general and problems of classroom learning in particular. It also helps in developing a comprehensive theory of classroom learning. We know from our daily experience in schools that some teachers are successful in the classroom than others. Some communicate very effectively in the class to students and some fail irrespective of their knowledge of the subject matter. What makes this difference? Definitely to be successful in the class, a teacher must know something other than the subject matter. It is the knowledge of science of behaviour which makes the difference. He/she must understand the students whom he/she teaches, their developmental characteristics, their abilitiesand the influence, and the contribution of heredity and environment in the process of an individual's personality development.

- *Better understanding individual differences:* No two individuals are alike in the world. The teacher has to face a class of 30 to 50 students who have a great range of individual differences. The teacher with the help of the knowledge of the kind of individual differences may adjust his/her teaching to the needs and requirements of the class.

- *Knowledge of effective teaching method:* Everyday experience shows that the lack of proper methods of teaching sometimes results failure of communication in the classroom. Educational psychology gives us the knowledge of appropriate methods of teaching. It helps in developing new strategies of teaching. Valid psychological principles not only suggest new techniques of teaching-learning, but also eliminate many traditional practices that have become obsolete in the present context.

- *Better understanding of problems of children:* By studying educational psychology, a teacher may understand the causes of the problems of children, which occur at different age levels, and can successfully solve them. There is a great difference in the method of solving problems of children by a trained teacher and an untrained teacher.

- *Knowledge of mental health:* Mental health of the teacher and the taught is very important for effective teaching-learning process. The teacher from the study of psychology can know the various factors which are responsible for the mental ill-health and maladjustment. He/she can be very helpful to prevent maladjustment in children provided that the prospective teacher is equipped with the fundamental knowledge of mental hygiene.

- *Curriculum construction:* Psychological principles are also used in formulating curriculum for different stages. Needs of the students, their developmental characteristics, learning pattern and needs of the society, all these are to be incorporated in the curriculum. The curriculum in recent years includes the needs of the individual and society so that maximum transfer may occur from school to social situations.

- *Measurement of learning outcome:* Psychological tools help the teacher to assess the learning outcomes of the students. He/she can also evaluate his/her teaching methods: and in the light of the performance of his/her students, he/she can modify his/her.

- *Research:* Educational psychology helps in developing tools and devices for the measurement of various variables which influence the behaviour and performance of students. Teachers can control, direct and predict the behaviour of students on the basis of research studies in classroom teaching.

- *Guidance for the education of exceptional children:* The most important single contribution of educational psychology is the provision and organization of education for the exceptional children who had been neglected and devoid of educational facilities.

- *Development of positive attitude:* If we examine the activities and curriculum of a training college, we find that teachers' training programmes aims to develop positive attitudes towards teaching profession and provide the prospective teachers with the necessary competencies to meet the classroom challenges. They develop confidence in trainees to face the problems and adaptability to deal with unexpected problems in daily classroom teaching.

- *Understanding of group dynamics:* In recent years, educational psychologists have recognized the importance of social behaviour and group dynamics in classroom teaching-learning. The teacher must know about the operations which work in total social environment and their effect on learning.

So far we have mainly concentrated on the theoretical side of the contribution of educational psychology to education. It has also influenced the practical aspect of education.

Contribution to practice of education

- *Problem of discipline:* 'Spare the rod and spoil the child' was the slogan of traditional teachers who tackled the problems of indiscipline by dint of corporal punishment. Now teachers who have the knowledge of modern educational psychology realize that the use of corporal punishment is inhumane. They have changed their attitude from an autocrat to a democrat.

- *Use of audio-visual aids:* Before Independence, the teachers hardly made use of audio-visual aids in their teaching. Rote memorization was the only method of learning. It has been experimentally proved now that the use of audio-visual aids makes the difficult concept more clear and definite and learning is more lasting. It is the contribution of educational psychology that teachers make use of various types of audio-visual aids in classroom teaching.

- *Democratic administration:* Former autocratic methods of administration in school and classroom have been changed by a democratic way of life. Both administrators and teachers are democratic, cooperative and sympathetic. Problems of administration are now solved by mutual discussion among the various agents of school.

- *Time table:* There was a time when arithmetic and geometry were taught from morning till evening. No consideration was given to the principles of psychology. Now subjects are kept in the time table keeping into consideration their difficulty level and fatigue index. No two difficult subjects are taught in successive periods.

- *Co-curricular activities:* Earlier, teachers used to give under importance to the theoretical subjects in schools. Activities like debate, drama, scouting and games were supposed to be a wastage of time. Now we give these activities due importance for the harmonious development of the personality of children.

- *Use of innovations:* Several innovative ideas have been introduced to improve the teaching-learning process. Activity-centred teaching, discussion method , micro-teaching, programmed instruction, and non-grade school classes at the primary stage are some of the important innovations.

- *Production of textbooks:* Educational psychology has helped the planning or textbooks. We now write textbooks. We now write textbooks keeping into consideration the intellectual development of children, needs and their interests at different age levels.

The objectives of educational psychology may be summarized as to:

- Provide teachers with some basic skills related to teaching.
- Give teachers guidelines to solve problems of teaching-learning process.
- Help teachers to understand the scientific knowledge, and
- Insil in teachers a spirit of inquiry for their professional growth.

1.4 SCHOOLS OF PSYCHOLOGY AND THEIR CONTRIBUTIONS TO EDUCATION

It is a well-known fact that psychology has been influenced by a number of disciplines. Psychology as as independent field of study has emerged recently. It is very important for the prospective teacher to have and adequate knowledge of the systematic development of psychology so as to understand the behaviour of learners for bringing about desirable changes in them. There are different view points or approaches or systems or schools of psychology.

1.4.1 Experimental Psychology and Experimentalist Psychologists

Four German scientists-Ernest Weber (1795-1878), Gustav Fechner (1801-1887), Hermann von Helmholtz (1821-1894) and Wilhelm Wundt (1832-1920), were intimately associated with the making of psychology as an experimental science. It was through research in physiology that each became interested in psychological problems. Wundt brought together the various lines of research in his first systematic book of psychology entitled Physiological Psychology in Leipzig (Germany) in 1879. Earlier William James (1842-1910), an American philosopher and scientist, had set up a small demonstration laboratory at Harvard in 1871, which he used as an adjunct to teaching.

After receiving his M.D. degree in 1858, Wilhelm Wundt started his career as a physiologist, but soon became interested in the more complex mental processes and was convinced that experimental methods of the physiologist could be applied to research on consciousness. Wundt is called the 'father of experimental psychology'.

Wundt's psychology was transplanted to the United States by his most outstanding student, Edward Bradford Titchener (1867-1927). His another brilliant student James McKeen Cattell (1860-1944) of Colombia University worked on the psychology of individual differences.

E.B. Tichener (1867-1927) carried systematic research on the lines of Wundtian tradition. He believed that the science of psychology should deal only with things as they are found to exist. The main objective of psychology is to study and understand human mind and its structure that is isolating elementary process, no idea of feeling that we actually experience as part of a consciousness is a simple process, but that all alike are made up of a number of really simple processes blended together. These simple processes are called "mental elements". They are numerous; there are probable some 50,000 of them; but they all be grouped into broad classes, as sensations and affections.' Scientific enquiry goes from "parts to the wholes". So, one must begin with the atoms of a total situation.

Structuralism has been criticized on the ground that general system of psychology was too narrow to embrace all aspects of human behaviour.

Educational implications : Since structuralism emerged out of laboratory experiments in Germany, it gave a careful method of data collection. It laid stress on the spirit of science and experimentation in treating educational matters. It emphasized systematic observation of the activities of mind. Experiments in the field of educational psychology were initiated on the basis of experimentation of structuralism.

1.4.2 Functionalism and Functionalist Psychologists

Functionalism is the name given to a system of psychology which studies mind as it functions in adapting the organism to its environment. The roots of this viewpoint go back to the evolutionary biology of Charles Darwin (1809-1882) and the pragmatic philosophy of William James (1842-1910). The functionalist viewpoint came into educational psychology and developed into a movement under the leadership of John Dewey (1859-1952), James Rowl and Angell (1873-1954).

William James spent most of his academic career at Harvard University. He was in turn a physiologist, psychologist and philosopher. His outstanding contribution in psychology was his brilliant book, Principles of Psychology (1890). His another book, Talks to Teachers (1899) is also of great significance. James made it cleat that mind, as it is revealed in habits, knowledge and perception is constantly engaged in active give-and-take relations with the environment. Mind, therefore, is useful or functional in adjustment: He emphasized the role of interest in learning. He stated, 'the great thing in all education is to make the nervous system out ally instead of our enemy'.

John Dewey (1859-1952) was a great philosopher, educator and psychologist. Dewey developed and interest in psychology, while working in psychology, while working for his doctorate on Immanuel Kant (1724-1804). It was at Michigan University where he taught psychology as well as philosophy, and Dewey wrote his functionally oriented textbook entitled, Psychology (1986) which became highly popular with undergraduate students. In keeping with his functional viewpoint in psychology, Dewey's philosophy saw social change as inevitable and capable of being directed for man's benefit. He treated ideas as plans for action that help the individual solve problem, of living and adjustment. In 1986, Dewey published his famous paper, "The Reflex Act Concept in Psychology" in which he argued that reflexes and other forms of behaviour ought to be interpreted in terms of their significance for adaptation. He believed that the study of the "organism as a whole functioning in its environment" was the proper subject-matter for psychology. In due course, Dewey became world famous as an exponent of the pragmatic view point in philosophy and for his advocacy of progressive education.

Contribution of Functionalism to education

Following is the chief contribution of functionalism to education :

1. Functionalism stresses that behaviour is adaptable to new situation of life. Accordingly, the teachers and the principal should provide such an environment to the students for learning as is conducive to arouse and sustain their motivation in learning.
2. Functionalism tended to replace theoretically overloaded curriculum by practical approaches.
3. Leaning by doing was given a central place in the methods of teaching-learning.
4. Functionalism emphasized the study of the various problems of the individual and their solutions.
5. It contributed a lot to child psychology and mental testing.
6. It pointed out the importance to understand the needs of children at different age levels.
7. It stressed the aspect of utility. In other words, it indicated that only those subjects should be included in the curriculums which were useful in society.
8. It led to the development of scientific enquiry in education.

9. It iniated new methods of teaching and learning.

1.4.3 Behaviourism and Behaviouristic Psychologists

John B. Watson (1878-1958) was an American psychologist who became an ardent proponent of behaviourism. As a graduate student at the University of Chicago, during formative years of functionalistic movement, he became interested in animal research and founded an animal laboratory. He emphasized the study of behaviour by experiments. Watson explained his behaviourism in an article "Psychology and the Behaviourist" which was published in the Psychological Review (1913). He explained his point of view in three books-An Introduction to Comparative Psychology (1914); Psychology from the Standpoint of a Behaviourist (1919) and Behaviourism (1925). He believed that concepts like mind-consciousness and image have no place. He stated that, psychology was the Science of Behaviour. According to him, behavioural acts are to be described objectively in "terms of stimulus and response, in terms of habit formation, habit integration and the like". Watson discarded mentalistic concepts such as consciousness and mind, etc., and proposed the following methods for the beahavioural research:

1. Observation, with and without instrumental control.
2. The conditioning reflex method
3. The verbal report method
4. Testing method.

   Watson showed how the objective, analytic methods of animal laboratory could be applied to human beings, particularly through the use of the conditioning response.In his book, The Psychological Care of the Infant and Child (1929), he pointed out the use of infants and children as subjects for psychological investigation. Watson suggested that the behaviouristic psychology had much to offer such professions as advertising, law, industry and education.

Contribution of behaviourism to education

P. Symonds has given the following implications of behaviourism for teaching and learning: 'The most potent reward (reinforcement) for class-room learning is the teacher's acceptance what the pupil does and the way he does it because this acceptance becomes a guide in his future activities. This acceptance on the part of the teacher can take the form of tangible tokens, such as gold stars, honours rolls and the like. But there is a tendency to short-circuit so that a "correct or right" will do equally well.'

Following are the chief contributions of behaviourism to education:

1. Behaviourism has given new methods and techniques of understanding the child behaviour.
2. It has contributed to the understanding of the emotions of the child.
3. It has given new methodology of teaching known as "programmed learning" which has been successfully employed in several countries.
4. It points out that all behavior is learnt in the process of interaction with environment.
5. It emphasizes the importance of environment and its impact on human growth.
6. It has led to the development of new approaches, methods and techniques of dealing with maladjustment in children.
7. It has brought psychology out from the controversy of mentalistic approach to human behaviour.
8. It has greatly contributed to the psychology of learning.
9. It has indicated the importance of motivation.

1.4.4 Gestalt School and Gestalt Psychologists

Gestalt psychologists took up arms against behaviourist and functionalist psychologists.they were represented by Max Wertheimer (1880-1943), Wolfgang Kohler (1887-1967) and Kurt Koffka (1886-1941)- all German psychologists. The fundamental Gestalt principle is that "the whole is different from the sum of its parts". Gestalt is a German word meaning whole, form, figure or configuration. The Gestalt psychologists took a dynamic or field view of the nervous system in place of the behaviouristic machine view.

Although born in Prague (Czechoslovakia), Wertheimer is associated with German psychologists as he did a lot of research work at the German Universities. He lauched the Gestalt School as a new movement opposed to both structuralism and behaviourism. In his well-known book, Productive Thinking (1945), he attacked the traditional view of "association" and "role learning" as the foundation of the thought processes. Wertheimer demonstrated with considerable success that when the teacher arranged problems to organize the elements of classroom exercises into meaningful whole,

insight would occur. This he contrasted sharply with the usual educational practices of drill and rote-learning. There were extensions of the Gestalt viewpoint into personality, child psychology and motivation, etc.

Contribution of Gestalt psychology to education

1. Gestaltists give importance to the perception of relation, organization and whole in learning. They state that it is the whole which determines the behaviour of its part. This implies that the teacher should present his subject-matter as a whole in the class.
2. Goals and purposes have an important place in learning. They activate the learners.
3. The teacher should start where the learners' perception are and not where his own perception happen to be.
4. The principal, the teachers and the students should work as an organized whole to improve the teacher-learning process in the school.
5. Behavioursim has thrown new light on the group or social learning in the classroom. It considers group behaviour to be an important factor in learning.
6. Gestalt psychology points out the need for interdisciplinary approach to educational problems.
7. Gestalt psychologists stress that learning by insight is more forceful.
8. Gestalt psychology emphasizes the importance of desirable environment for learning.

1.4.5 Psychoanalysis School and Psychoanalysists

In the words of J.P.Chaplin and T.S. Krawiec (1979), 'Of all the schools of psychology, psychoanalysis has captured the imagination of the general public to the extent that many laymen erroneously psychology with psychoanalysis.'

This highly influential movement got underway in Vienna at die end of the 19th century under the leadership of Sigmund Freud (1856-1939). Freud obtained a degree in medicine with specialization in neurology. As a practicing physician, he became aware that many of his patients were in reality suffering from mental conflicts that were manifested as physical ailments and disorders. He was convinced that what the patient needed was psychotherapy rather than physical therapy. He became associated with a French practitioner J.M. Charcot (1825-1893) and a German J. Breuer (1842-1925), who had been utilizing hypnotic treatment in the case of hysteric patients.

Freud deeply studied the technique of hypnotherapy and foud that its scope, was limited and in several cases the cure was superficial. The illness subsequently broke out in another form with a different set of symptoms. Freud eventually recognized that the real value lay in the psychic analysis.

The psychoanalysis usually consists of having the patient relax on a couch and freely tell whatever comes to his or her mind. This is the method of free association. The psychoanalyst listens to and observes the patient as unobstructively as possible for emotional reactions, signs of distress and resistance to treatment. Out of his clinical experience Freud developed a number of important concepts-the division of the personality into id, ego and superego. He emphasized the importance of unconscious in mental life. He considered the dream a main route into "unconscious process".

Dream interpretation became an important part of both the therapeutic process and theory of psychoanalysis. Freud also felt that sexual malfunctions underlie hysteria and other neurotic disorders. His conclusion that neurotic disturbances originate in early childhood have made everyone who is engaged in the care, training and education of children, extremely child-centred. The impact of Freudian psychoanalysis had a profound influence on the direction of development psychology which considers the child no longer as a miniature adult but as an individual with his or her own needs, potentials and problems.

Freud's collected works consist of 24 volumes. His landmark publications include the following:

1. The Interpretation of Dreams (1900)
2. The Psychopathology of Everyday Life (1904)
3. The Three Essays on the Theory of Sexuality (1905)
4. Beyond the Pleasure Principle (1920)
5. The Future of an Illusion (1928)
6. Civilization and Its Discontents (1930)

Contribution of psychoanalysis to education

1. Psychoanalysis has brought out the need for early childhood education.
2. Freud emphasized that unconscious motivation plays an important role in the process of learning.
3. Psychoanalysis emphasizes the importance of the experiences of early childhood in the process of learning and education. These early experiences play an important role in laying down the foundation of the personality of the child. Among the major factors leading to the development of positive attitudes in the child towards life are affection, love and sympathy.
4. Psychoanalysis states that children should get opportunities to express their emotions freely in and outside the class. This is very conducive to the healthy development of children.
5. Psychoanalysis throws a lot of light on the causes leading to maladjustment in children.
6. Psychoanalysis appeals to the teachers to be positive in their outlook.

Table 1.1 Major Schools/Systems of Psychology At a Glance

Major School	Founder/Chief Exponent	Chief Method	Subject matter of Study	Chief Areas of Concern
1. Associationism	1.D.Hartley (1705-1757) 2.E.L. Thorndike (1874-1949)	Philosophical Analysis	Cognitive Process	Laws of Memory. Nature of Learning
2.Psychophysics and Quantitative Psychology	1.E.Weber (1795-1878) 2.G.Fechner (1801-1877) 3.F.Gallon (1822-1911) 4.A.Binet (1857-1911)	Quantitative Measurement		
3.Structuralism	1.W.Wundt (1832-1920) 2.E.B. Tichener (1867-1927)	Introspection	Consciousness	Sensation. Attention. Images. Affective Process.
4.Functionalism	1.William James (1842-1910) 2.John Dewey (1859-1952) 3.J.R. Angell (1869-1949) 4.Harvey Carr (1873-1954) 5.R.S. Woodworth (1869-1962) (Dynamic Psychology) 6.J.Piaget (1896-1980) (Cognitive Thinking)	Objecive, Experimental Studies, Introspection	Mind viewed in terms of its adaptative significance for the organism.	Perception. Learning. Mental Testing.
5.Behaviourism	J.B.Watson (1878-1958)	Conditioning	Behaviour	1.Sensation 2.Animal Learning 3.Physiological Processes
6.Gestalt	1.M.Wetheimer (1880-1943) 2.W.Kohler (1887-1967) 3.K.Kofka (1886-1941)	Phenomenological Experimentation	Mental and Behavioural Processes as wholes.	Perception, Thinking.
7.Psychoanalysis	Sigmund Freud (1856-1930)	Free Association and Dream Analysis.	Analysis of unconsciousness Dynamic Processes.	Psychotherapeutic Treatment of the Neurotic
8.Humanistic and Existential Psychology	1.A.H.Maslow (1916-1970) 2.C.R.Rogers (1902-NA)	Phenomenological Analysis	Modes and Problem of Existence.	Personality Work Ethos.

1.4.6 Constructivism

Constructivism is a basic theory that elaborates on how knowledge is built (or, "constructed") when new information pours in and comes in contact with the already existing knowledge bank, which has been developed in the course of time by various researchers. Constructivism finds its roots in cognitive psychology as well as human biology. It is that approach to education which gives due emphasis to the various methods followed in the creation of knowledge, and that finds adaptability in the changing education scenario.

Constructs are the special types of filters that are selected in order to place over those realities to bring change in the existing reality-from the state of 'chaos' to the state of 'order'. Von Glasersfeld describes constructivism as 'a theory of knowledge with roots in philosophy, psychology, and cybernetics'. Constructivism finds its implications in the theory of instruction. Discovery, hands-on, experiential, project-based and task-based learning process, and collaborative are a number of applications that base teaching and learning on constructivism.

It is not at all necessary that constructivist learning theory implies that a learner must follow a "constructivist" pedagogical strategy. Rather, it is the opinion of most of the researchers that knowledge is constructed, but a few, for instance, mainstream instructional designers) do not adopt an instructional design pattern, which can be tagged as being "constructivist".

In a normal situation, a constructivist teaching strategy is based on the assumption that learners learn best when they gain knowledge through exploration and active learning. In place of textbooks, hands-on materials are utilized, and the learners are motivated to think and reason. Moreover, they need to be give explanation on their reasoning, rather than memorizing and reciting facts fed to their memory. Education revolves around the themes and concepts, and the relationship between them; rather than memorizing and reciting facts to their memory. Education revolves around the themes and concepts, and the relationship between them; rather than isolated information.

Under the theory of constructivism, educators focus on building relations between facts and promoting new understanding in students. Instructors tailor their teaching strategies to student responses and encourage their students to analyse, interpret and predict information. Teachers/Instructors also rely heavily on open-ended questions and promote extensive dialogue among learners. Constructivism calls for the elimination of grades and standardized testing. Rather, the theory of constructivism suggests that assessment becomes a part of the learning process with the intention that learners can play a bigger role in evaluating their own growth.

ACTIVITY

Research on the Internet and give a detailed account on the formation of Gestalt school of psychology.

DID YOU KNOW

In the 20th century, constructivism had a great impact on various modern art movements including graphic and industrial design, architecture, theatre, film, fashion, dance, and even music.

1.5 SUMMARY

In this unit, you have learnt that:

- Behaviour includes the actual actions and responses of organisms, both animals and human beings.
- Psychology tries to develop cause-and-effect relationship between different variables under study, and then formulate theories based on the findings.
- Physiological psychology is that science which studies the biological bases of behaviour. Physiological psychologists want to explore the relationship between body processes and behaviour.
- Aerospace psychologists try to design training programmes for the astronauts so that they can adapt their behaviour according to the new environmental settings and are in sound mental health.
- Psychology has a very important role to play in the field of education. Psychologists work in schools and universities to guide students in their educational and vocational problems. They also work to solve problems of adjustment. Conducting aptitude, intelligence and personality tests is a part of their counselling sessions.
- Educational psychology is the application of psychological findings in the field of education. It is the systematic study of the development of the individual within the educational settings.
- Psychological principles are also used in formulating curriculum for different stages. Needs of the students, their developmental characteristics, learning pattern and needs of the society, all these are to be incorporated in the curriculum.
- It is very important for the prospective teacher to have and adequate knowledge of the systematic development of psychology so as to understand the behaviour of learners for bringing about desirable changes in them.
- As per the experimental psychology, the main objectives of psychology is to study and understand human mind and its structure that is isolating elementary processes from the complexity of consciousness.

- Functionalism stresses that behaviour is adaptable to new situation of life. Accordingly, the teachers and the principal should provide such and environment to the students for learning as is conducive to arouse and sustain their motivation in learning.
- Gestaltists give importance to the perception of relation, organization and whole in learning. They state that it is the *whole* which determines the behaviour of its part. This implies that the teacher should present his subject-matter as a whole in the class.
- The psychoanalyst listens to and observes the patient as unobstructively as possible for emotional reactions, signs of distress and resistance to treatment. Out of his clinical experience Freud developed a number of important concepts-the division of the personality into *id*, *ego* and *superego*. He emphasized the importance of unconscious in mental life. He considered the dream a main route into "unconscious process".
- Constructivism is a basic theory that elaborates on how knowledge is built (of, "constructed") when new information pours in and comes in contact with the already existing knowledge bank, which has been developed in the course of time by various researchers.

1.6 KEY TERMS

- **Abnormal psychology:** Study of various forms of abnormal behaviour, and its treatment through various psychological techniques.
- **Behaviour:** The way one acts in a given situation.
- **Educational psychology:** Application of psychological findings in the field or education.
- **Folk psychology:** Branch of psychology which aims to study the culture, art, religion, superstitions and other such aspects.
- **Learning process:** Signifies whatever people do when they learn.
- **Learning situation:** Refers to the environment in which the learner finds himself/herself, and in which the learning process takes place.
- **Rote memorization:** Memorization technique that is based upon repetition of study material.
- **Total behaviour:** Includes both convert and overt activities.

1.7 ANSWERS TO 'CHECK YOUR PROGRESS'

1. 'Overt behaviour' is that behaviour which can be observed and measured and 'covert behaviour' is that behaviour which includes our inner experiences and those mental activities that are going on in the rain.
2. 'Environmental psychology' is that branch of psychology which refers to role of environment on behaviour. Here, the psychologists lay emphasis on modifying and restructuring environment for social well-being.
3. Educational psychology helps the teacher to transform a student into a responsible and participating citizen; a sensitive and reflective human being; and a productive and creative person.
4. The 'learning situation' refers to the environment in which the learner finds himself/herself, and in which the learning process takes place. It includes factors or conditions that affect the learner and the learning process. The teacher is one element and another is the classroom setting (ventilation, light, noise and arrangement of seats, etc.).
5. Structuralism has been criticized on the ground that general system of psychology was too narrow to embrace all aspects of human behaviour.
6. Behaviourism has given new methods and techniques of understanding the child behaviour.
7. Gestaltists give importance to the perception of relation, organization and whole in learning. They state that it is the *whole* which determines the behaviour of its part. This implies that the teacher should present his subject-matter as a whole in th eclass.
8. Under the theory of constructivism, educators focus on building relations between facts and promoting new understanding in students.

1.8 QUESTIONS AND EXERCISES

Short-Answer Questions
1. What are the principles of learning?
2. What are the basic assumption of Kurt Lewin's Field Theory of Learning?
3. What are the educational implications of Hull's Reinforcement Theory?
4. What are the basic postulates of Achievement Motivation Theory?
5. Write a short note on 'Costructivism'

Long-Answer Questions
1. Give a detailed account on various theories of learning.
2. Explain Maslow's Self-Actualization Theory.

3. Write a short note on Gagne's Hierarchy of Learning.
4. Give a detailed account on any two 'theories of learning'.

1.9 FURTHER READING

Gelder, M., R. Mayou and P. Cowen; Shorter Oxford Textbook of Psychiatry, Fourth edition. Oxford University Press, Oxford, 2004.

Sadock, B.J. and V.A. Sadock; Concise Textbook of Clinical Psychiatry, Second edition, Lippincot Williams Wilkins, Philadelphia, 2004

S.S. Chouhan; Advanced Educational Psychology, seventh edition, Vikas Publishing Pvt. Ltd., New Delhi, 27.

UNIT 2 METHODS OF EDUCATIONAL PSYCHOLOGY

Structure

2.0 Introduction

2.1 Unit Objectives

2.2 Experiment Method

2.3 Differential Method

2.4 Clinical Method

2.5 Observation Method

2.6 Introspection Method

2.7 Summary

2.8 Key Terms

2.9 Answers to 'Check Your Progress'

2.10 Questions and Exercises

2.11 Further Reading

2.0 INTRODUCTION

Educational psychology is the scientific study of the behaviour of the learners in relation to their educational environment. Behaviour in all its aspects can be studied scientifically through a single technique or approach known as observation. This single technique or approach, however, gives rise to several methods or approaches, depending upon the conditions in which observations have to be recorded, the procedure adopted and tools used. In this unit, we will describe the important methods that are generally used to collect data to find out the solutions of various problems, which the teacher faces in teaching-learning process in classroom.

In this unit, we would be discussing the major methods of educational psychology-experimental method, differential method, clinical method and observation method. Two more significant methods of educational psychology – (i) introspection method, and (ii) scientific enquire method-have also been discussed indetail in this unit.

2.1 UNIT OBJECTIVES

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

- Discuss the basic features of experiment method of educational psychology
- Explain the basic concepts of differential method of educational psychology
- Elaborate on the merits and demerits of clinical method and observation method of educational psychology
- Discuss on the introspection method and scientific enquiry method of educational psychology

2.2 EXPERIMENT METHOD

The experiment method is considered to be the most important method of scientific enquiry, which has been developed in psychology by the continuous efforts of psychologists for an objective and scientific study of human behaviour. One of the major contributions of behaviourism is the development of the experimental method in order to understand, control and predict behaviour. The experimental method is considered to be a mehod par excellence for use in certain areas of educational psychology. It is the most precise, planned, systematic and controlled form of observation.

According to some psyhologists, only experiments make controlled observation, variation of factors, perfect quantification and rigorous objective checking of hypothesis possible. The experimental method uses a systematic procedure called experimental design. The term 'experimental design' has two different meanings. One is that experimental design represents the six basic steps referred above which are generally followed in an experiment. The second meaning of experimental design is more restrictive. It defines experimental design as a procedure for assigning subjects to experimental conditions and selecting an appropriate statistical procedure. Experimental design provides important guidelines to the researcher to carry out his/her research systematically. The stability of the design depends on the findings of the research systematically. The stability of the design depends on the findings of the research study. The layout of a design depends on the type of problem the investigator wants to investigate. Readers should know that no one design solves all the problems of a research study.

There are many problems in education psychology due to which research in a laboratory set-up cannot be conducted. Such problems are studied in actual classroom situations. A variety of experimental designs have been developed by researches in recent years. To acquaint the readers with basic structure of experimental design, we will give an example of laboratory experiment and then a few experimental designs to be used in actual classroom situations.

Laboratory experiment

Some problems can be conveniently studied in laboratory where the experimenter can control all variables except the one under study. The experiments can be conducted on individuals or a group of subjects. Thorndike's experiments on cast, Ebbinghau's experiments on memory, mirror drawing, attention, perception, and learning are all examples to laboratory experiments. A sample of laboratory experiment is described as follows:

1. *Name:* Maneesh *Age:* 10 years. *Sex:* Male
2. *Date:* 6.2.83 *Time:* 10 A.M.
3. *Physical and mental condition:* Normal
4. *Problem:* To study the problem of bilateral training
5. *Apparatus and material:* Micro drawing experiment apparatus, stop-watch, paper, and pencil.
   Instruction: Detailed instructions are given to the subject to perform the task.

Experimental design and data

S. No	Trial	Time	Error
1.	Right Hand		
2.	-do-		
3.	-do-		
4.	-do-		
5.	-do-		
6.	-do-		

6. *Analysing the results:* The investigator analyses the data obtained from the subject.

7. *Conclusion:* The investigator on the basis of his analysis of data draws a certain conclusion.

Experimental designs outside the laboratory

Experimental designs can be divided on the basis of two important factors, i.e., the control procedure and the number of groups involved in an experiment. The type of control employed in experiment plays an important role in determining the reliability and validity of conclusions drawn from the experiment. The number of groups involved in an experiment is important to determine the control procedure and the type of research problems an investigation may answer.

The number of groups may vary from one to three up to an infinite number of groups depending on the type of problems an investigation and nature of control procedure employed by the experimenter. Following are the samples of experimental design:

1.One group design

a. One group pre-test design: This type of design is the simplest one. It is commonly called pre-experimental design. In such a type of experiment no formal comparison is possible, for there is no second group with which any comparison can be made. Let us illustrate with an example: Suppose a teacher treats 10 students who are addicted to smoking in a period of three months. At the end of the period, six students give up smoking. Such type of designs does not control any of the sources of invalidity.

b. One group post-test design: This design has not been a successful one, though is considered better than the one group pre-test design. In this design, the experimenter first tests a group on some aspects of behavior and then gives special treatment(X) to the same group. He/she tests the performance of the group after the special treatment. He/she statistically analyses the data and calculates the difference between the pre-test and post-test scores of the group.

Pre-test Independent variable post-test

T1   X   T2

Example: Suppose in the beginning of the semester, we administer a test of educational psychology to students of M.Ed. education and then teach them the subject throughout the semester. At the end of the semester, we administer the post-test (T2) and determine the difference between the scores on the initial and final tests.

2. Two group design

Research in education and psychology has often been criticized for lack of control. In recent years, more rigorous designs have been evolved by using statistic to make researches more scientific and objective.

Generally, researchers use two parallel group techniques to see the effects of an independent variable on some dependent variable. Two groups are equated on the basis of significant variable. One group is known as the experimental group and the other is called the control group. The experimental group is subjected to a certain experience or to a specific treatment, whereas the control group is not given any type of special treatment. After providing special treatment to the experimental group, both the groups are administered the same final test. The scores are statistically compared and conclusion are drawn as regards to the effect of special treatment on the experimental group.

a. Pre-test post-test design: In this design both, experimental and control groups are administered pre-test and then the experimental group is given special treatment (X), whereas control group is not giveb any type of treatment. After the special treatment, post-test is administered to both the groups. The paradigm is as follows:

S.No	Group	Pretest	Treatment	Post-tests
1.	Experimental	T1E	X	T_2E
2.	Control	T1C	No training	T_2C

Example: Suppose in a tuition centre, we teach two batches (A and B) the same subject. However, one batch (A) is presented with additional help in form of online tips, while the other batch (B) receives no extra aid. Both the batches are then tested. We test both the groups-pre-test and post-test. Thus, this may be diagrammatically represented as follows:

Batch A   Batch B

Pre-Test   Pre-Test

Additional Help (Treatment)   No Additional Help (No Treatment)

Post-Test   Post-Test

b.Randomized control-group pre-test post-test design: The researcher in this design follows the following procedure:

  (i)   He/She selects the subject by random method.
  (ii)   Assigns subjects to group and X (Treatment) to groups by random method.
  (iii) Tests the Ss on the dependent variable.
  (iv)   Keeps all conditions the same for both the groups except for exposing the experimental S but not the control group to the independent variable for specific time.
  (v)   Test the 'Ss' on the dependent variable.
  (vi)   Finds the difference between the two.
  (vii) Compares the results to see whether the application of 'X' (treatment) caused a change in the experimental group.
  (viii) Applies an appropriate statistical procedure.

3. Matched two group design

A matched two group design is a modification of the totally randomized two group design described above. In this design, both groups are matched in terms of some variable, the experimenter feels he/she would influence the dependent variable. Suppose, we want to test the retention of two types of words closely associated and disassociated. We believe that IQ will influence how well a person can retain words so we match the two groups on IQ. Let us be more concrete to understand this point. Suppose there are ten subjects with IQ as follows:

Subjects	IQ
1.	110
2.	110
3.	90
4.	90
5.	80
6.	80
7.	80
8.	80
9.	70
10.	70

In order to divide theten subjects into two matched groups of 5 subjects each. We first divide the ten subjects into five pairs by going down the list making 1 and 2, 3, 4, and so on. We then randomly assign one of each pair to either group A or B by flipping a coin.

4. Multi group design with one independent variable (ANOVA)

Sometimes the investigator has to compare the effect of different values of some variable, or has   to see the effect of several alternative variables on more than two groups. The procedure for carrying out one-way analysis of variance

(ANOVA) is the same as for two group designs. The distinguishing feature between the two types of investigation is the type of statistical analysis used.

5. Factorial design

Factorial design is employed where more than one independent variable is involved in the investigation. Factorial designs may involve several factors, which are symbolically represented in the following way:

Design	Symbolic
Two factors	A X B
Three factors	A X B X C
Four Factors	A X B X C X D
N Factors	A X B X C X D X N

6. Small N Design

We have briefly mentioned various experimental designs, which are termed as 'large N group design'. In all large N group designs, the number of subject is large and is divided into two groups. The large N group design is not always applicable in a classroom situation. In many instances, the psychologist or teacher is faced with situations in which a large N is not possible, for example, delinquency, problem of indiscipline, etc. With the introduction of statistic in psychology, it is possible to conduct scientific research on a small N group.

Merits of experimental method

The merits of experimental method are as follows :

- Experimental method is the most systematic procedure of solving problems. It provides reliable information. The major advantage of this method is the ability of the experimenter to control the application and withdrawal of independent variables.
- The finding of exoerimental method are verifiable by other investigators under identical conditions in which the initial experiment was conducted.
- It provides objectives and precise information about the problems.
- Use of computers in data analysis in recent years has opened new frontiers of possibilities for the study of complex problems.
- It advances our stock of knowledge of cause-effect relationship in the behaviour of students and provides guidelines to solve teaching-learning problems.
- It tests the traditional beliefs and throws new light on the problems and opens avenues for future progress.
- It provides innovative ideas for further experimentation.
- The experimenter can apply a controlled procedure more precisely in a laboratory experimentation. The experimenter can record the dependent variables more precisely.

Demerits of experimental method

The demerits of experimental method are as follows:

- The main objection raised against the experimental method is that an experiment is an observation of an artificially determined pattern of behaviour as Thorndike's cat experiments or Skinner's rat experiments. Thus, we can say that the experimental method sets its own limit by setting the experimental situation to study behaviour.
- Experimental data does not provide insight into the total behaviour of the subject. We know that behaviour is, for all practical purpose, an interaction between the rganism and its environment. Obviously, there is more than one way for such interaction to take place.
- G.S Klein criticizing the experimental method remarked that the appearance of significant relations was often prevented by the rigorous experimental procedure of keeping variables constant. Instead of grasping the process as a whole, the experimentalists often omit important factors by their tendency to eliminate and isolate experimental variables or to keep them constant.
- Another limitation of the experimental method in educational psychology stems from the fact that experiments cannot handle pattern of covert behaviour of children in laboratory very well. Overt and violent actions (riots) do not fit into a laboratory setting. Moreover, the experimental method cannot accurately test the entire gamut of human drives and feeling.

- Psychologists have criticized the fact that most experiments have been conducted on rats, cats and dogs. Principles have been deduced on the basis of experiments on animals; how far it is justifiable to generalize those principles, and laws for human beings has not yet been conclusively decided.
- The experimental method is time consuming and costly. Every teacher cannot be expected to conduct an experiment as it requires specialized knowledge and skills to conduct experiments.
- All problem of educational psychology cannot be studied by the use of the experimental method. Due to complexity and tremendous variability of human mind and human phenomena, experiment in social sciences are not possible in the same sense as they are in physical science where we can experiments a number of times under controlled and practically identical conditions.
- In recent years, psychologists and religious leaders have raised ethical questions in connection with administration of some psychological tests, which encroach upon the privacy of the subjects. Certain situations, may not be created because they are not socially acceptable as it is not possible to purchase human infants and raise them in extreme deprivation.
- The Gestalt psychologists criticize the experimental method because of its quantification aspect. They criticize the inappropriate, imprecise and faulty apparatus of psychologists. It is not possible to construct tools that will make accurate and sufficiently discriminating measurement of individual differences.
- In many cases, investigators cannot manipulate human beings and cannot adjust class schedules to meet the requirements of the research designs that are most theoretically desirable.
- Social scientists cannot generalize and apply their findings to all human beings. Experiments only produce statements of probability. Certainty cannot be achieved through experimentation.

2.3 DIFFERENTIAL METHOD

Differential method, also known as Survey method, is used to study individual differences among students. Studies in the field of educational psychology make extensive use of the statistical survey, which is based on sampling by direct observation.

This method makes use of various techniques of collcting data such as tests, questionnaire, observation, interview and use of statistics in analyzing the data.

There are three broad categories of survey method that share the common feature of carrying out their observation on samples of individuals, which are regarded as representative of the larger population to which they belong. The three categories are as follows:

(i) Field study: A field experiment may be defined as a scientific investigation carried out in the field, which involves the direct manipulation of some independent variables. The field study is conducted in natural classroom teaching-learning situation spread over a wide area. Developing programmed material can be cited here as an example. The programmed material at its initial stage is tested on individual and small group of students for whom it is developed. After two initial tests, it is tried out in an actual classroom situation for a final validation, which is generally called a field try-out. Generally, in a field experiment steps are the same as those used in laboratory experiments.

(ii) Developmental survey: Developmental survey and developmental clinical case-study though appear to be alike, differ in their purpose . Clinical method (case study) involves the individual, whereas developmental survey studies involve typical patterns of change in the growth and decline of behaviour over a specific period of lifespan of a group or an entire population. Developmental surveys may be longitudinal or cross-sectional. We can study the development of intelligence in culturally disadvantaged children from birth to five years using either longitudinal or cross-sectional method of study.

(iii) Differential survey: O' Neil refers two examples of differential survey which he describes as 'those concerned with establishing typical differences between individuals and between classes of individual'. The study conducted by Klineberg involving differences in intelligence between racial and national groups in Europe come under differential survey.

Merits of differential method

- Relatively easy to administer.
- Can be developed in less time (compared to other data-collection methods)

- Cost-effective, but cost depends on survey mode.
- Can be administered remotely via online, mobile devices, mail, email, kiosk, or telephone
- Conducted remotely can reduce or prevent geographical dependence
- Capable of collecting data from a large number of respondents.
- Numerous questions can be asked about a subject, giving extensive flexibility in day analysis
- With survey software, advanced statistical techniques can be utilized to analyze survey date to determine validity, relianbility, and statistical significance, including the ability to analyze multiple variables.
- Broad range of data can be collected (e.g., attitudes, opinion, beliefs, values, behavior, factual)
- Standardized surveys are relatively free from several types of errors.

Demerits of Differential Method
The possible sources of errors are as follows:

- Sample error: Sometimes, samples are not true representatives of the population. When the samples are biased, the results of the sample measured may not be true for the whole population.
- Inadequacy of test content: The sample of items and behaviour may also be inadequate. This is particularly true of mental test and personality test. If the psychometric criteria of are reliable measuring instrument are not fulfilled, reliable results can scarcely be expected.
- Non-cooperation of subjects: The most significant source of error is lack of cooperation of the subjects. Sometimes, answers to the questions are not honestly given.

The differential method is based on individual differences. Therefore, all the measures applied to the calculation of individual differences are included in this method. The differential method is also name as the normative survey method or the field survey method as the investigator has to go to the field to make his/her investigations. It is sometimes called the statistical method for the reason that statistical techniques become the major devices for the study of individual differences. Now, the question that arises is, how to differential methods differ from experimental method? It may be felt that the difference between the experimental and differential methods is only arbitrary and artificial, since the procedure of finding the effects on dependent variables by the application of the independent variables is the same. This, however, is not true as T.G.Andrews (1958) comments:

'Differentiation between experiments and differential methods may appear quite artificial and it is true that all psychologists will not agree to such an apparently artificial classifical scheme. Neverthless, it should always be made clear that the independent variables resulting from individual difference are never under the investigator's control to the same degree that experimental variables are.'

Thus, differential methods differ from the experimental approach in that the investigator cannot intentionally manipulate the variables, and each of these is studied as an independent variable. For instance, in studying the relationship of achievement with intelligence, it is not possible to manipulate intelligence. Therefore, we have to take each individual and study his/her achievement in relation to his/her intelligence. After that, we can try to arrive at certain conclusions with the help of statistical techniques.

2.4 CLINICAL METHOD
The clinical method is primarily used to collect detailed information on the behaviour problems of maladjusted and deviant cases. The maladjustment may be in the form of anti-social behaviour, emotional disturbances, of backwardness in the area of learning and socio-economic environment. To collect complete data pertaining to a case, it utilizes various techniques to compile relevant information, which has some direct or indirect bearing on the specific problems of the case. The case is studied intensively in temporal sequence from birth of the individual to the present manifestation of the behavioural problems in other activities. The objective of the clinician is to delve deep into the unconscious of the individual to precisely locate the underlying cause of maladjustment and to suggest remedial measures. The complete and detailed study of a case may involve the use of observation, interview, medical examination; and use of various tests of intelligence, personality, aptitude, interest, etc., the clinician collects the material about the case in totally. The past and present experiences, conditions in home , school and society are given due importance. Information from all sources is pooled together in a sequential order to prepare a comprehensive case history and locate the cause of maladjustment. Clinicians generally use two different procedures to develop case study, which are described in brief as follows:

1.   Clinical case study/Case history

This method is specifically followed in learning difficulties, emotional disturbances, delinquency and other behaviour problems. This technique has been borrowed from medical science. The psychologist or the teacher, as the case, may collect detailed information of past history and present conditions. The developmental history is reconstructed from the memories of the case (individual), family and friends. The preparation of a case study is not the work of a single individual, but a combined venture of the social workers, teachers, parents, doctors and psychologists. In preparation a clinical case study, the information is collected from the following source:

(a) Preliminary information: Name, age, sex, parents' age, education, occupation, income, number of children, social status.

(b) Past history: Condition of mother during pregnancy, any incident- child's development after birth-physical, mental, emotional, social-illness, relation between parents and other members of the family, achievement of the child parents death, birth order, etc.

(c) Present condition: The information may be collected under the following heads:

Physical: Results of medical examination of any disease.

Mental: I.Q. special abilities, general intelligence.

Social: Home environment, friends and their types, social environments in school, home and neighbourhood.

Emotional: Anxiety, fear, temperament, attitude, etc.

Interest: Personal, social, vocational, and special aptitude.

School achievement: Position is school, failure, special achievement, etc.

   We have given a tentative list of various sources from which information may be collected to prepare a case history. The sources of information can vary in individual cases dependimg upon the type of behaviour problems of the case. Briefly, we can summarize that case study method helps to understand the root causes of maladjustment and is a very valuable method in suggesting remedial measures for the rehabilitation of maladjusted cases.

Limitation of clinical case study

The limitations of clinical case study are as follows:

- In the preparation of a case study, the clinician collects descriptive account of the individual from his/her past life and present Experiences. The accounts given by the individual, parents and friends may or may not be true since all the disadvantages of crude observation and anecdotal report are involved. The information is not verifiable and is highly subjective. In India, parents, particularly illiterate, hide the defects and problems of their sons and daughters and exaggerate their qualities. Information supplied by them may hardly be relied upon to reach some definite conclusions. The veracity of the subject, memory, embellishments of vivid details, and so on, can influence the case history.

- Complex behaviour is observed under complex conditions, some of them in the past and in spite of clinical insight, the observer has no guarantee from the procedure that the events and the uniformities observed are relevant and crucial ones. Some striking aspect of the case may distract the observer's attention away from others that may be more critical, but less spectacular, and there is nothing inherent in the method to prevent this error.

- The third limitation involves the question of theoretical interpretation of the data. The clinician sets the stage for his/her investigation according to the theoretical position he/she espouses (Freudian as Rogerian), and often has to make his/her interpretation after the event of observing. Since the clinician's observation is likely to be influenced by his/her theoretical preference,so are the conclusions.

- The procedure is largely intuitive an impressionistic. Interpretations may depend on the aspects of the case that make the bigger impact on the observer as positive instances. There is nothing about the method to minimize the common sources of error.

2.   Developmental case study

In developmental case study, of genetic method, two approaches are generally followed to collect the data:

(a) Longitudinal approach: In this approach, we select a sample of children (from birth to maturity or of any specific age level) and observe their developmental characteristics continually from year to year. Ideally, it would necessitate observation for 24 hours a day, year in and year out; but in practice, it is not possible for the clinician to devote so much time to record observation. Developmental studies on animals have been conducted, but their results cannot be generalized for human beings. Continuous developmental studies are time-consuming, so psychologists have recorded substantial segments or sampling of behaviour throughout the principal developmental periods of the child. Tests are applied and assessment is made at regular intervals. This technique can be used to study physical, mental, language, interest, emotional, and social developmental characteristics of children.

(b) Cross-sectional approach: The second approach is the cross-sectional in which we select a sample from different age levels to study specific aspects of development. For example, we can study reading interests, play activities or emotional and social characteristics of children of different ages. Both approaches have their advantages and disadvantages.

The above discussion regarding the nature and working of the clinical methods may lead us to conclude that clinical methods in all their shapes and forms are always concerned with the diagnoses and treatment of adjustment problems or mental and psychological illness of the individual. It is, however, not necessary that clinical methods should always be used to study or treat mental illness or abnormal behaviour of an individual.

The real purpose of clinical findings is to help in conducting an intensive and thorough study of the behaviour of the individual. Therefore, it does not matter whether we carry out the study of a normal or abnormal behaviour with the help of a clinical set-up. There is no bar to study the behaviour of normal persons or even exceptional individuals like high achievers, creative geniuses, saints, social workers and leaders by employing clinical methods of collecting relevant information through various means. Whether an individual requires treatment or follow-up depends upon the case under clinical study. A clinical study, thus, does not necessarily require the methods of treatment. The treatment can be affected only when the individual under study needs it. Therefore, broadly speaking, clinical methods may be considered as the methods of studying the behaviour of an individual in all possible details, relevant to the purpose of the study.

2.5 OBSERVATION METHOD

With the development of psychology as an objective science of behaviour, the method of introspection was replaced by careful observation of human and animal behaviour to collect data by research workers. Observation literally means looking outside oneself. It is one of the important and basic methods for collecting data in almost all types of research studies. This method produces one of the basic elements of science, i.e., facts that are collected by observing the overt behaviour of the organism in order to locate underplaying problems and to study developmental trends of different types.

Overt behaviour is the manifestation of cover conditions within the organism. The study of overt behaviour, indirectly gives the clue to the mental condition of the organism. The development of systematic observation, as a method of collecting data, generated interest in developmental psychology and many studies on developmental characteristics of children were conducted that mode great contributions to the field of child psychology. Observation may be of the following types: direct and indirect, natural and artificial, scheduled and unscheduled, participant and non-participant. Here, we will describe only two types of observations:

(i) Natural observation: In natural observation, we observe the specific behavioural characteristics of children or adults in natural settings. Subjects do not become conscious of the fact that their behaviour is being observed by someone. The teacher can observe the behaviour of his/her students on the playground or in any other social situation when students may not become conscious of his/her presence. In a child clinic,a one-way screen is used to observe the behaviour of devian children. The observer can observe the behaviour of children, but cannot see the observer.

(ii) Participant observation: In this form of observation, the psychologist establishes perfect rapport with a group of adolescent so that they may not become conscious of his/her presence and may not hide their actual behaviour.

Observation studies are particularly very important and yield significant result on the developmental characteristics of children. No doubt, observation is a scientific technique of collecting data whose results can be verified and relied upon to locate behavioural problem of different types, but it suffers from limitations as well.

Merits of Observation Method

- Being a record of actual behaviour of the child, it is more reliable and objective.
- It is and excellent source of information about what actually happens in classroom.
- It is a study of an individual in a natural situation and is therefore more useful than the restricted study in a test situation.
- The method can be used with children of all ages. Youger the child, the easiest it is to observe him. This method has been found very useful with shy children.
- It can be used in every situation, physical – activities, workshopand classroom situation as well.
- It is adaptable both to the individuals and the groups.

Demerits of Observation Method

The demerits of observation method are as follows:

- Observation is useful only for collecting data over behaviour, which is manifested in a number of activities. This overt behaviour does not reliable information regarding the internal mental process. We can only guess about the mental state of the individual on the basis of overt behaviour, which may or may not be true. It becomes very difficult to draw any conclusion in case of adults who can hide their actual behaviour in the presence of the observer. In such cases observation fails and yields on tangible results, which may throw light on the actual behaviour of the subjects.

- Subjectivity of interpretation is another limitation of observation. The observer may interpret his/her sensations of external stimulus on the basis of his/her past experiences. He/she may be biased in his/her interpretation by his/her perception of the situation when he/she makes inferences on the basis of scanty sensory cues. It also suffers from impressionism, prejudice and distraction, etc. It has also been found in some studies that strong personal interests tend to make the researcher see only those things, which he/she wants to see.

- Observation is subjected to two kinds of errors – (i) sampling error and (ii) observer's error. The first errors because of inadequacies of selecting the situation to be observed. The observer's error may be due to the knowledge and background of the situation to be observed. Sometimes, the observer is not familiar with the total situation and hence may commit error.

Suggestion for improvement

In recent years, improvement have been made in the methodology of observation to make it a more objective and reliable instrument of collecting data for research purpose. The following suggestions are given in order to eliminate the types of errors:

- **Use of mechanical devices:** Generally, observers do not record their observations immediately on the spot. However, the observations should be immediately recorded. They should not be left for future because there is every possibility of their being contaminated to the personal prejudices and left out due to failure of recall. The use of mechanical device, such as a camera or a tape recorder, may be made to improve the reliablility of observation. A system of notation, or shorthand, may be used for recording purposes.

- **Definite objectives:** The investigator must in advance specify in clear and definite the terms of the objectives of the observation. A detailed analysis of the behavioural characteristics that are to be observed should be ensured.

- **Schedule:** The investigators must decide the time and hour of observation and a schedule should be honestly followed. A detailed schedule in the form of questions or statements should be prepared in advance to note down the observations. The method of recording the observation should be made clear. It will be more reliable and objective if a numerical value is assigned to various aspects of behaviour. Detailed instruction should be spelt out to minimize variations in recording observations by different investigators.

- Training: Observation is not haphazard activity. It is a systematic and scientific method that requires skills. Competencies, aptitude, and proper training for observation, must acquire the broad background in the field of the investigator's problem. The investigator should train himself/herself to counteract his/her emotional and intellectual biases in order to report accurate observation. For this purpose, he/she may get rigorous training on similar problems. He/she should develop keenness and alertness to identify minor incidents in observation. The investigator should make comprehensive and complete notes of all pertinent incidents.

- Precise: The investigator should make his/her observation in precise, concrete and unambiguous form. His/Her description should mean the same thing to other investigators as they mean to him/her. It will be more reliable if the investigator describes his/her data quantitatively because numerical measures are more precise than words which make possible further treatment of the problem by statistical analysis.

2.6 INTROSPECTION METHOD

Historically introspection is the oldest method which was formerly use in philosophy, and then in psychology to collect data about the conscious experiences of the subject. Introspection means self-observation. It may also be explained as 'looking within oneself to experience one's own mental state'. This method was developed by structuralists in psychology who defined psychology as the

study of conscious experiences of the individual. For them, introspection was a process of examining one's own mental process of thought, feelings and motives. The individual introspects, observes, analyses and reports his/her own feelings. For example, when you are angry, you introspect your own mental feelings and examine the mental process in this state of anger.

Merits of Introspection Method

The merits of introspection are as follows:
- William James emphasizing on the importance of introspection as a method of collecting data remarked, Introspective observation is what we have to rely on first an foremost and always. The word "introspection" needs hardly to be defined- it means, of course, looking into our own minds and reporting what "we there discover". Everyone agrees that "we there discover" states of consciousness. So far as I know, the existence of such states has never been doubted by any critic, however skeptical in other respects he may have been.
- Thus, we see that introspection is an important method of collecting data that has been used from the beginning of psychology as a separate subject.
- This is the easiest method which is readily available to the individual. Individual can at any time introspect about his/her mental state without involving the use of any apparatus and without incurring any expenditure
- According to Stout, in introspection we are concerned with the nature of experience itself and with the laws of the mental process. The observer in introspection is directed towards the answering of questions of theoretical importance for the advancement of out systematic knowledge of the laws and conditions of the mental process.
- Introspection has its historical importance. It generated research that gradually resulted in the development of more objective methods. Introspection is still used in all experimental studies.
- Further, introspection is the observation and reporting of one's own mental processes it is considered important on account of its unique nature. It is a simple and readily available method. One's mental processes are always present and can be introspected at any time. Introspection is, therefore, able to give us a direct and immediate insight into one's own mental processes without involving any extra expenditure of material of apparatus.
- Moreover, introspection provides adequate knowledge of the inner of covert experiences and thus the inner behaviour of an individual. Thus, thought or feeling can be revealed through introspection.

Demerits of Introspection Method

The demerits of introspection method are as follows:

- The most serious objection against introspection is that human beings are not static inanimate objects, such as stones of chairs, etc. Human mental process undergoes constant changes. So, when one attempts to introspect, the state of mental process disappears and it becomes a retrospect. It is difficult to introspect perpetually changing psychological experiences.
- The subject of experience is divided into two halves in the process of introspection. The mind is directed inward towards its own working and is required to attend to them. The attention is divided into two parts. One is the mental operation itself that is to be observed, and the other is the object to which this mental operation is directed. To expect any individual to attend the workings of his/her own mind during a mental process, especially in complex or emotional state, such as anger or fear, is a mistaken idea. Ross commenting on the limitation of introspection method said, 'the observer and the observed are the same, the mind is both the field and the instrument of observation'.
- The data collected by introspection is highly subjective. There is no way to prove the reliability of the data. It is practically impossible to explore the mental process of others. There is no independent way of checking the contents of another person's mind.
- There are conflicting reports, as regards the findings collected from different introspection on the same experience under the same conditions.
- Influence of preconceptions is always present in introspection. It has the danger of being biased and rendered unreliable even in adults when they are at such a level of mental development that they would unconsciously put in personal knowledge in introspection. The reporter can deliberately lie and hide the facts to mislead the experimenter.
- Introspection cannot be applied to children, animal and abnormal people. It requires highly trained and skilled workers to introspect.
- The Gestalt psychologists have raised a very valid objection against introspection that it analyses experience into images, sensation and feelings. It does not yield adequate representation of the unitary experience in its totality which, if reported strictly in terms of these elements, would not convey a clear idea of the experience to another person. It is an elemental approach to study human thought process.
- Qualitative estimate are hard enough to handle, but when it comes to subjective data for the purpose of analysis and statistical treatment, the types of scales available are severely restricted, and it is doubtful whether any genuine measurement for the verification of introspective reports is possible.

- Kant, a famous philosopher, pointed out a major methodological barrier of introspection that it was not possible to accept conscious experience as the subject matter of psychology, and at the same time to accept introspection as its proper method. For Kant, the difficulty was that introspection could not introspect the introspective activity, that is be the subject, action and object, all at the same time.

Thus, if we try to evaluate the introspection method, we find that it is based on self-speculation, lacks reliable communicability, replicability and reasonable exactness or precision. It is neither sufficiently scientific and practicable, nor simple. It cannot, therefore, be taken as an adequate or single method of psychological studies. The conclusion arrived at by this method needs to be supported by specific findings through some other objective and reliable method.

ACTIVITY

Research on the Internet and construct a flow chart on the merits and demerits of observation method.

DID YOU KNOW

Although the clinical psychologists and psychiatrists share similar fundamental aim i.e., the treatment of mental disorders; their outlook, training, and methodologies differ. The most significant difference being that the psychiatrists are licensed physicians, whereas the clinical psychologists are not.

2.7 SUMMARY

In this unit, you have learnt that:

- One of the major contributions of behaviourism is the development of the experimental method in order to understand, control and predict behaviour. The experimental method is considered to be a method par excellence for use in certain areas of educational psychology. It is the most precise, planned, systematic and controlled form of observation.
- The type of control employed in experiment plays an important role in determining the reliability and validity of the conclusion drawn from the experiment.
- Generally, researchers use two parallel group techniques to see the effects of an independent variable on some dependent variable. Two groups are equated on the basis of significant variable. One group is known as the experimental group and the other is called the control group.
- A matched two group design is a modification of the totally randomized two group design---pre-test and post-test. In this design, both groups are matched in terms of some variable, the experimenter feels he/she would influence the dependent variable.
- The procedure for carrying out one-way analysis of variance (ANOVA) is the same as for two group designs. The distinguishing feature between the two types of investigation is the type of statistical analysis used.
- In all large N group designs, the number of subject is large and is divided into two groups; and in this group design, it is not always applicable in a classroom situation.
- Studies in the field of educational psychology make extensive use of the statistical survey, which is based on sampling by direct observation.
- Differential method makes use of various techniques of collecting data such as tests, questionnaire, observation, interview and use of statistics in analyzing the data.
- The differential method is also named as the normative survey method or the field survey method as the investigator has to go to the field to make his/her investigations. It is sometimes called the statistical method for the reason that statistical techniques become the major devices for the study of individual differences.
- There are three broad categories of survey method that share the common feature of carrying out their observation on samples of individuals, which are regarded as representative of the larger population to which they belong. The three categories are: (i) field study, (ii) developmental survey, and (iii) differential survey.
- The clinical method is primarily used to collect detailed information on the behaviour problems of maladjusted and deviant cases. The maladjustment may be in the form of anti-social behaviour, emotional disturbances, or backwardness in the area of learning and socio-economic environment.
- The complete and detailed study of a case may involve the use of observation, interview, medical examination; and use of various tests of intelligence, personality, aptitude, interest, etc., the clinician collects the material about the case in totality. The past and present experiences, conditions in home, school and society are given due importance.
- Clinical case study method is specifically followed in learning difficulties, emotional disturbances, delinquency and other behaviour problems. The developmental history is reconstructed from the memories of the case (individual), family and friends. The preparation of a case study is not the work of a single individual, but a combined venture of the social workers, teachers, parents, doctors and psychologists.
- Continuous development studies are time-consuming, so psychologists have recorded substantial segments or sampling of behaviour throughout the principal developmental periods of the child.
- Observation method produces one of the basis elements of science, i.e., facts that are collected by observing the overt behaviour of the organism in order to locate underplaying problems and to study developmental trends of different types.
- In natural observation, we observe the specific behavioural characteristics of children of adults in natural settings. Subjects do not become conscious of the fact that their behaviour is being observed by someone. The teacher can observe

the behaviour of his/her students on the playground or in any other social situation when students may not become conscious of his/her presence.

- The observation may be influenced by the observer's perception of the situation when he/she makes inferences on the basis of scanty sensory cues. If suffers from impressionism, prejudice and distraction, etc. It has also been found in some studies that strong personal interests tend to make the researcher see only those things, which he/she wants to see.
- The use of a mechanical device, such as a camera or a tape recorder, may be made to improve the reliability of observation. A system of notation, or shorthand, may be used for recording purposes.
- Introspection method was developed by structuralism in psychology who defined psychology as the study of conscious experiences of the individual. For them, introspection was a process of examining one's own mental process of thought, feelings and motives.
- The scientific method may be compared to a powerful and practical torchlight in the hand of the researcher, lighting his/her path towards the discovery of new knowledge and inventions for the welfare of the society. It is one of the most promising instrument that a man possesses for understanding, controlling and predicting behaviour and other phenomena of nature. It develops human understanding and increases the accumulation of tested and verified.
- The term 'scientific method' has been use in different situations convening various meanings according to the analysis of a problem, which is based on four basic assumption:
(i) Empiricism
(ii) Determinism
(iii) Parsimony
(iv) testability
- J.S. Mill's doctrine on scientific enquiry says that it is legitimate to start from observation of a large number of cases in order to find the generalization or laws that fit them. His logic recognizes all sorts of universal propositions or generalizations obtained in all sorts of way from experiences.

2.8 KEY TERMS

- Determinism: States that there is law and order in the universe; and that physical and all other phenomena can be explained in terms of cause and effect.
- Empiricism: To view the causes of phenomenon; implies the testing of a statement and examine the speculator, superstitious and hearsay statements developed in the past as scientific statements.
- Experimental design: A procedure for assigning, subjects to experimental conditions and selecting an appropriate statistical procedure.
- Factorial design: Employed where more than one independence variable is involved in the investigation.
- Field experiment: A scientific investigation carried out in the field, which involves the direct manipulation of some independent variables.
- Introspection: Process of examining one's own mental process of thought, feelings and motives.
- Observation: One of the important and basic methods for collecting data in almost all types of research studies.
- Overt behaviour: Manifestation of cover conditions within the organism; gives clues to the mental condition of an organism.

2.9 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Experimental designs can be divided on the basis of two important factors, i.e., the control procedure and the number of groups involved in an experiment.
2. The experimental group is subjected to a certain experience or to a specific treatment, whereas the control group is not given any type of special treatment.
3. The Gestalt psychologists criticize the experimental method because of its quantification aspect. They criticize the inappropriate, imprecise and faulty apparatus of psychologists. It is not possible to construct tools that will make accurate and sufficiently discriminating measurement of individual differences.
4. Differential method, also known as Survey method, is used to study individual differences among students.
5. Clinical method (case study) involves the individual, whereas developmental survey studies involve typical patterns of change in the growth and decline of behaviour over a specific period of lifespan of a group or an entire population.
6. Clinicians generally use two different procedures to develop case study, which are: (i) clinical case study, and (ii) developmental case study.
7. The longitudinal approach to developmental case study technique can be used to study physical, mental, language, interest, emotional, and social developmental characteristics of children.
8. Observation may be of the following types: direct and indirect, natural and artificial, scheduled and unscheduled, participant and non-participant.
9. In participant observation, the psychologist establishes perfect rapport with a group of adolescents so that they may not become conscious of his/her presence and may not hide their actual behaviour.
10. Observation is subjected to two kinds of errors- (i) sampling error and (ii) observer's error. The first error occurs because of inadequate of selecting the situation to be observed. The observer's error may be due to the knowledge and background of the situation to be observed. Sometimes, the observer is not familiar with the total situation and hence may commit error.

2.10 QUESTIONS AND EXERCISES

Short-Answer Questions
1. What are merits of the 'experimental method'?
2. What do you understand by 'laboratory method'? Give an example.
3. What are the three possible sources of errors in case of differential method?
4. What are the limitations of 'clinical case study'?
5. Write a short note on the concept of 'developmental case study'.
6. What are the limitations of 'participant observation'?

Long-Answer Questions
1. Differtiate between 'one group design' and 'two group design' with examples.
2. Elaborate on the limitations of the 'experimental method'.
3. 'There are three broad categories of differential method that share the common feature of carrying out their observation on samples of individuals.' Elaborate.
4. 'Clinicians generally use two different procedures to develop case study.' Explain.
5. Give a detailed account on the observation method of educational psychology.
6. Write a short note on Introspection Method.

2.11 FURTHER READING

Thorndike, R.L; *Measurement and Evaluation in Psychology and Education*, Wiley Eastern Limited, New Delhi, 1970.
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UNIT 3 GROWTH AND DEVELOPMENT

3.0 INTRODUCTION

A teacher need to study the growth and development of learners as he/she has to deal with learners of different socio-economic and cultural backgrounds. The teacher as an agent of the society is responsible to bring desirable changes in the behaviour of a learner so that he/she may shoulder the responsibilities of a good citizen to accelerate the process of national development. The other reason to study development is its continuity from the past to the present, and present can be understood better in terms of its past history.

Prior to joining a school, the child accumulates enormous experiences in his home and neighbourhood environment which are very useful to start formal education in an effective way.

Individual differences among children play an important role in education. The teacher must know the potentialities and capacities of each and every child of his/her class so that he/she may exploit them to the maximum for the benefit of the individual and the society. The teacher must know the basic principles of growth and development and the characteristics which emerge at different age levels in various developmental dimensions to provide effective guidance for the harmonious development of children.

In this unit, we will discuss the basic concepts of growth and development, along with a special coverage on theories of child development and various dimensions of adolescent development. The unit gives due coverage to developmental tasks, heredity and environment and their educational implications.

3.1 UNIT OBJECTIVES
After going through this unit, you will be able to:
Explain the meaning and nature of growth and development
Discuss the general principles of growth and development
Describe the features of various stages of development
Explain the theories of physical, cognitive, emotional and moral development
Interrelate them in some different way. In brief, development is confined to qualitative changes in the organism.

The process of development has been explained on the basis of different viewpoints. Some of them are as follows:

1.   Development as maturation: According to the famous child psychologist. Arnold Gessell, the role of physical changes is important in development. The development from infancy to adolescence is governed by physical changes that are mapped out in the individual's genes. For instance, a growing nervous system changes systematically and automatically; and this results in predictable changes in bones and muscles. He used the word maturation to describe growth processes

that are governed by such automatic and genetically determined signals. He believed that most major changes in the organism are based on maturation.

2. Development as learning: Baer has defined development as 'behaviour change which requires programming; and programming requires time, but not enough of it to call it age'. Here, programming refers to sequences of learning which may happen naturally or may be arranged in the life of an individual. Development, in this view, is a collection of learning experiences which the child acquires in the process of interaction with his environment.
3. Development as synthesis: Piaget says, 'For some psychologists development is reduced to a series of specific items… In reality development is the essential process, and each element of learning occurs as a function of total development rather than being an element which explains development.'

According to Piaget, there are four basic elements in development : (i) Maturation; (ii) Experience; (iii) Social transmission (learning through language, schooling or training by parents); and (iv) Equilibration.

Distinction between growth, development and maturation

Growth refers to a process of becoming larger or longer or more numerous or more important, largely a physical change. Development, on the other hand, is a process in which something (mostly positive) transforms into a different stage or improves. Growth is taken to mean an increase in the size of an object or a living being. 'The lump as grown in size' is an example of its usage. Development is taken to mean an example of its usage.

Development may mean a kind of improvement in the condition of health. 'He developed a better pulse rate now' is an example. Growth describes the process of growing. 'There was a rapid growth in the economy of the country' is an example. It indicates an increase in value. 'There was a growth can mean an increase in a crop or yield of some fruit for that matter. 'The farmer was amazed with the tremendous growth of grapes'. Development may mean a process of gradual transformation. You can use the word 'development' to suggest a process of developing.

Development is experiential change. It is orderly, adaptive and durable changes that occur throughout our life. Maturation, on the other hand, is naturally occurring change that is genetically controlled. Some developmental changes are considered maturational, or indicators of physical maturity. Maturation is progression of developmental changes toward the characteristics of adults. Physical maturation occurs from the time of conception, but some of the most commonly recognized indicators of maturation become apparent during adolescence. Changes in body shape, breast development in girls, pubic hair development in both genders, and development of facial hair in boys are visible indicators of maturation toward adult appearance of the body. The cessation of the growth of long bones. Associated with the final attainment of adult stature is also a maturational event.

Although growth and maturation are certainly related, distinguishing between them is important because some physiological and hormonal processes affect growth and maturation differentially, as do some diseases.It is easy to observe that children of the same size can differ in maturational status and that fully mature individuals (adults) can be of different sizes.

Development leads to change

- Growth refers to quantitative changes—increase in size as well as structure
- Development, by contrast, refers to qualitative changes. It is a progressive series of orderly, coherent changes. Progressive means that changes are directional, which lead forward rather than backward.
- *Goals of developmental changes:* self-realization or achievement of genetic potential

Types of changes in development:

- A human being is never static and is always undergoing changes.
- Changes are antagonistic: On one hand, there is positive growth, such as gaining maturity with experiences and on the other, there is atrophy and decay of the human body as it grows older.
- Changes are interrelated: Changes never occur in isolation. They are in the form of size, altered proportions, and disappearance of old and acquisition of new features.

Early development is critically important more than later development

- As per Freud, maladjustments lead to unfavorable child experiences. The more recent studies carried out on this aspect substantiate this theory.

- As per Erickson, babyhood is a time to 'build trust or distrust' --- here, the individual learns to view world as safe, reliable and nurturing of threatening and unpredictable
- Conditions affecting early childhood foundations: Favourable interpersonal relations, emotional states, child-training methods, early role play, childhood family structure, and environmental stimulation.
- Early foundations: Early learning and experience play a big part and family should take part in the learning. Early foundations quickly develop into habitual patterns will have a lifelong influence. Contrary to popular belief, children do not outgrow undesirable traits as grow older. Therefore, it is recommended to ensure that early learning is geared towards developing desired traits.

Maturation and learning both result in development

- Meaning of maturation: It is the unfolding of characteristic potentially present in the individual that come from the individual's genetic endowment.
- Phylogenetic functions – common to race
- Ontogenetic functions – common to individual
- Meaning of learning – Development that comes from exercise and effort
- Importance of readiness to learn – interest in learning and sustained interest will gradually lead to improvement.
- Effects of maturation and learning interrelationships: Variations in pattern of development, maturation sets limits to development, maturational limits are rarely reached, deprivation of learning opportunities limits development. Stimulation is essential for full development and effectiveness of learning depends on proper timing.

Nature versus Nurture

The nature *versus* nurture debate concerns the relative importance of an individual's innate qualities *versus* personal experiences in determining or causing individual differences in physical and behavioural traits. The view that humans acquire all or almost all their behavioural traits from 'nurture' is known as *tabula rasa* ('blank slate'). This question was once considered to be an appropriate division of developmental influences, but since both types of factors are known to play such interacting roles in development, many modern psychologists consider the question naive – representing an outdated state of knowledge.
In the social and political sciences, the nature *versus* nurture debate may be contrasted with the structure versus agency debate (i.e., socialization *versus* individual autonomy).

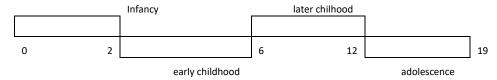3.3   GENERAL PRINCIPLES OF GROWTH AND DEVELOPMENT

The following are the general principles of development:

1. **Development is a product of the interaction:** Development is a process resultant from a constant flux or interchange of energy within an organism and his environment. Hereditary forces inherent in the genetic constitution of the individual and environmental forces influence the development of the organism. It is very difficult to distinguish the contribution either of the two forces. An individual is a by-product of its constant interaction with its environment.

2. **Development follows an orderly sequence:** Individuals differ in rate of growth and development. However, development follows an orderly sequence in all individuals and shows high degree of similarity in the order in which various developments appear. Psychologists have reported several directional trends in the development. Following are the main trends:
    (i) *Cephalo caudal:* Development starts from head and proceeds towards heel.
    (ii) *Proximodigital:* Development starts from the centre line of the body to the outer parts, more distant, from it.
    (iii) *Locomotion:* Locomotion develops in a sequence in all infants of different cultures of the world. The sequence is creeping, crawling and walking.
3. **Development is a continuous process:** Development begins from the time of conception in the womb of the mother and continues till maturity. But it should be kept into consideration that it is not always smooth and gradual. There are sputs in physical growth and psychological functioning as increase in height and weight, sharp rise in vocabulary during pre-school years and sudden improvement in problem-solving abilities during adolescence.
4. **Bilateral to unilateral trend:** The newborn is essentially a symmetrical organism anatomically, physiologically and functionally. This functional symmetry is revealed in the early motor development. The infants up to the age of 2.5 years use both the hands with equal ease. The hand preference starts after the age of two-and-a-half year.
5. **Different aspects of development are interrelated:** Different aspects of development are interrelated and interdependent. A child's early social behaviour is interrelated with his/her physical development. If the child is physically handicapped, then his/her social behaviour will be retarded. The motor development of walking has positive

effect on the intellectual development of children. Thus, we see that different types of developments are interdependent and help each other.

6. **Development is an individualized process:** All individuals develop in their own way. Each child has his/her own rate of physical, mental, emotional and social development. If we observe six-year old children, we find great differences in their height weight and social, emotional and learning readiness. Even at different ages, children have different rates of development. The rate of growth is very high in infancy and then it slows down and continues throughout one's life. Growth may occur by fits and stsrts, meaning thereby that the rate of growth changes at different stages of child's development.

7. **Development proceeds from the general to the specific:** In all types of developments, we find the principle of mass differentiation and integration. The world at the time of birth is a big buzzing, blooming confusion for the child. Out of mass and undifferentiated behaviour emerge more differentiated, refined behaviour and goal-directed response. We can take any developments and find that this principle applies. For example, language development of the child begins from the birth cry, as mass response. Out of this mass response, differentiation starts and gradually the child acquires vocabulary of many words, and consequently the skill of communication develops.

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9. **Rate of development differs in male and female children:** There is a difference in the growth rate of boys and girls. Girls mature earlier in comparison to boys. Girls are taller than boys during pre-adolescence, but by the end of adolescence boys surpass them.

3.4 STAGES OF DEVELOPMENT

The following are the major stages of human development

In this section, you will learn about early childhood and later childhood. The adolescence stage is discussed in section 3.6

3.4.1 Dimensions of Development at Early Childhood Stage

At the early childhood stage, children witness different types of development.

- **Physical development:** Growth in physical dimensions during the period of 2 to 6 years of age is not as accelerated as that experienced in infancy. The child begins to assume the body proportions of an adult. Growth of lega is rapid and the legs represent about half of one's total height. The head growth is slow and trunk growth is intermediate. Generally, the weight of a three-years-old male child is about 33 pounds and is 38 inches tall. The girls are a bit lighter and shorter. By the age of five years, the average height for boys is 43 inches and the average weight is 43 pounds. The height and weight are affected by a number of variables, such as height of parents, nutrition, illness, etc.

  In addition to size and weight, the child undergoes other physical and physiological changes. The muscles develop at a very rapid speed. Larger muscles are far better developed than the smaller and finer one. Physiological changes occur in respiration, heart rate slows down and blood pressure goes up steadily. Brain has developed 90 per cent of its adult weight. Nerve fibres in the brain areas come close to maturity level by the end of pre-school period.

- **Perceptual development:** The child in early childhood develops a variety of motor skills which are repeated. Self-feeding, self-dressing, bathing, brushing the hair, playing with toys, using pencils, jumping, hopping, etc., develop at the age of 5 to 6 years.

  The perceptual development begins from mass movements to differentiation and integration. Table 3.1 lists the norms for children from 2 years to 5 years of age.

Table 3.1 Developmental Norms (Bulher, Gessell Terman)

Motor	2 years	3 years	4 and 5 years
Development	Walks without help, jumps, runs.	Skips, hops	Free and active movement, responds to music
Fine motor coordination	Copying.	Can match shapes, sees similarities and differences	Can name colours.
Perceptual	Identifies self, matches colours.	Can fit nets, boxes.	Matches shape and colours, distinguishes names.
Vocalization	200 words, uses few words.	900 words, follows commands.	Can repeat 4 digits-2000 to 3000 words, can define familiar words.
Adaptive behaviour	Bowel control.	Builds blocks, can draw a man.	4 digits, draws body with details.

- Language development: The development of the infant begins from birth cry. The ten-month-old child is able to use one word.; but by the end of the first year, its vocabulary increases to 3 to 4 words. Good home environment and early childhood training help in the development of vocabulary. It has been reported by several studies that there is positive correlation between intelligence and language development.
- Intellectual development: The intellectual development of the child is accelerated after the age of two because now he/she begins to explore his/her social environment and acquires new experiences.

  The following are the major characteristics of intellectual development:
  o Child begins to form concepts of physical and social reality;
  o By the age of six the child develops perception of size, shape, colour, time and distance, etc.;
  o Memory increase at a very rapid speed. The child can learn by rote memorization;
  o Creativity develops in children and imagination begins to grow;
  o Thinking and reasoning develops in relation to concrete material; Span of attention increases from 7-20 minutes and interest in exploring the environment increases;
  o The child is now able to use symbols in language, draw symbolic play and engage in problem solving; and
  o The child asks questions about his/her environment.

- Social development: A child is born in a social environment where his/her personality development is shaped in accordance with the norm of the society.
  o Sense of trust and mistrust develops in children themselves and their environment;
  o Feeling of autonomy develops in children. They begin to explore their environment;
  o Social environment expands beyond home;
  o Children of both sexes play together without any discrimination. They actively participate in group in which physical energy is used such as hide and seek;
  o They learn to cooperate with others and make friends on shared interests and similar personality traits:
  o Children take interest in fairy tales and tales and animal stories;
  o Negativism increases between the years three to six. It is a product of social situations. It is said that the more the child is frustrated by adult interference, the more negativistic his/her behaviour will be;
  o Girls are more dominating than boys in play situations;
  o The child seeks social approval of his/her action.

- Emotional development: Emotions play an important role in life and contribute in the personal and social adjustment of the individual provided they are directed into wholesome expression. Emotions have the following effects on the developing individual:
  o Emotions give us energy to face a particular situation in life;
  o Emotions work as motivators of our behaviour;
  o Emotions add pleasure to our everyday experience in life;
  o Emotions maintain our interest in work;
  o Emotions influence our adjustment in the society;
  o Highly emotional conditions disturb out mental equilibrium, reasoning and thinking;
  o Emotions serve as a media of communication between individuals and guide the individual to modify in order to conform to the social standard; and
  o Emotional deprivation leads to personality maladjustment.

3.4.2   Dimensions of Development at Later Childhood

Later childhood is an important phase of life. Redl has characterized this period as the time 'when nicest children often begin to behave in the most awful way'. The parents and teachers are annoyed with children and vice versa. It is a period which requires proper guidance and counselling by parents and teachers for the adequate adjustment of children in the society.

Different types of development during later childhood are discussed as follows;

Physical development

There is slow increase in weight and height during late childhood. Girls are ahead of boys by two years. Changes are shown in all general proportions of the body. Children are free from diseases at this age. Physiologically, the girls at the age of 11 are a full year ahead of the boys. Shedding of mild teeth and growth of permanent teeth changes the appearance of mouth; flattening of forehead, sharpening of the nose, broadening of the chest, and motor skills develop through play.

The following are the marked physical changes during the later childhood stage.
- Increased manual dexterity;
- Increased strength;
- Increased resistance to fatique; and
- Increased accuracy and endurance in relation to games

Intellectual development

- The child begins to make clear distinction between himself/herself and the outer world. He/She seeks reality in his/her environment.
- The concept of natural laws becomes almost fully developed by 12 years of age.
- It is the time for eager absorption of information and ready accumulation of ideas. Learning and memory become more efficient because the child enters formal schooling.
- Capacity for logical thinking increases. The child becomes increasingly efficient in selecting, developing and applying cognitive operations in relation to concrete objects.
- Interest in science stories and mechanical operations reaches its height at this age.
- Courage and loyalty increase. Children show courage in doing things.

- Imaginative plays are given preference to.
- Use of reading of factual material, scientific and mathematical information, and fiction, with a realistic theme increases.
- Use of causal relationship in thinking about physical, mechanical, and natural phenomena in the environment increases.
- Early imaginative fears disappear by the age of 12.
- High ability to generalize is shown by children of 10-12 years of age. Children are more concerned with immediate cause-and-effect relationship and current happenings.
- Flavell (1977) has suggested that the mind of the child during this period has a better general understanding of problems. The child has a much better sense of what a conceptual problem is. He/She can rationally analyse a problem. He/She is able to deal with the environment in a flexible, efficient and symbolic manner. The child has at his/her disposal a set of operations or rules that are logical although concrete.

Emotional development

Emotions are very important for life. Without emotions life becomes monotonous and dull. They change with the age of the child.
- Early pattern of emotional expression changes. By the end of late childhood the child learn to control his/her emotional expression in social situations.
- The emotional responses of the child become less diffuse, random and undifferentiated.
- Emotions are expressed even in the absence of concrete objects.
- Emotions are most contagious during childhood, because children are highly suggestible and dependable on others.
- Early childhood fears of animals, high places and noise disappear and fear of supernatural, imaginary creatures, fear of failing, being ridiculed and being different appear.
- Anger is caused by thwarting, teasing, making unfavourable comparisons with other children, interruption of activities in progress, ridicule by peers or elders, and negligence, etc.
- Parental favouritism causes jealousy in childhood.
- Joy, pleasure, love, curiosity, grief and affection appear in childhood.

Social development

The process of socialization confines to home and neighbourhood environment in early childhood, but as the child enters school his/her social circle widens.

- It is the period when children form peer group of their own sex and remain outside the home. Peer group becomes an important agent of socialization.
- It is the period of peak unruliness in social and home.
- Complaints of disobedience are highest in percentage during this period.
- Children reject adult standards and circle of friends widens.
- Delinquency begins more during this period than adolescence.
- Sex differentiation becomes sharp. Girls play with girls and boys play with boys. There is sex difference in play activities. Girls are more antagonistic
- Boys are more rebellious than girls and their groups are more organized than the groups of girls.
- Children take interest in group games. Boys and girls form their own groups. Group consciousness develops and the child becomes less selfish, self-centred and aggressive but more cooperative and outgoing.
- Social consciousness develops very rapidly. It is called 'gang age' period when the child associates himself/herself with the peer group of the same age who feel and act together. The child shows great loyalty to his/her gang. He/She conform to the stand of his/her gang.

3.5   DIMENSIONS OF ADOLESCENT DEVELOPMENT

Adolescence is the most important period of human life. Poets have described it as the spring of life of human beings and an important era in the total lifespan. The word "adolescence" comes from a Greek word "adolescere", which means "to grow to maturity". A number of definition have been given by psychologists from time to time. Some psychologists define it as the transitional period. The period runs between childhood and adulthood, and is sometimes called the "period of teenage".

According to A.T.Jersild, 'adolescence is that span of years during which boys and girls move from childhood to adulthood, mentally, emotionally, socially and physically'.

Some psychologists believe that it is the period when an individual is capable of begetting offspring. It means that when power of reproducing its own kind is attained by the individual, we can say that he/she has become an adolescent.

Dorthy Rogers defines adolescence as, 'a process rather than a period, a process of achieving the attitudes and beliefs needed for effective participation in the society'.

Adolescence starts with puberty. Usually, puberty starts between ages 10-13 in girls and 12-15 in boys. During puberty, your body will grow faster than at any other time in your life, except when you were a baby. A boy or a girl at birth and before puberty can be distinguished from the sex organs. Sex organs are necessary for reproduction, therefore, they are called the primary sexual characteristics.

At the onset of puberty, physical changes and development that are not directly part of the reproductive system, but distinguish the male from the female are called "secondary sexual characteristics". The changes at puberty can be studied under three headings; (1) development of secondary sexual characteristics, (2) development of sex organs, and (3) intellectual, emotional and psychological development.

Significance of the study of adolescence

Adolescence is the most important period of human life. A major part of a country's population ranges between the 13 to 21 years. The country's success in various fields of life depends on the proper guidance of adolescents. The significance of the study of this period may be discussed under the following heads:

- Better understanding developmental characteristics and problems: Every teacher and parent must know about the nature and changes emerging in transition period from childhood to adulthood. It is also necessary for them to be familiar with causal factors of the problems of adolescents so that proper individual, educational and vocational guidance may be provided for adequate adjustment in the society.
- Maintenance of mental health: The progress of a country depends on the maximum exploitation of its human resources. Sound mental health is one of the first requisite conditions of development. Adolescence is marked with a number of problems which affect the mental health.
- Adjustment to responsibilities: The study is significant to provide the knowledge of needs and developmental tasks for adolescents. Parents and teachers can help adolescents to adjust to their responsibilities. By understanding the needs of adolescents, the teacher and administrator can frame appropriate curriculum, school policies and methodology of teaching them.
- Rise in curiosity: To study the psychology of adolescent may be a desire to know something about oneself. Such a desire is quite justifiable and understandable if the student is in the adolescence period. But it is also a sound motive for an older person. The older person who studies adolescence has within himself/herself a potential source of insight into issues facing the person of adolescence period-issues that once he/she had to face. It may also be due to the scholarly interest of the individual.
- Better planning curriculum and education: The needs, interests, aptitudes and changes occurring during adolescence are very important and useful for teachers, principals and guidance workers for planning education, curricular and co-curricular activities, and for developing proper instructional material.

Fallacies about adolescence

A systematic study of adolescence started with the classic work of G. Stanley Hall in the beginning of the 20th century. Prior to the study of Hall, some misconceptions regarding adolescence prevailed in society; some of them still exist even after scientific contradiction and disapproval. These misconceptions are listed below:

- The first fallacious view is that adolescents are awkward in physical appearance
- The second misconception is that adolescents are rebellious
- The third misconception is that adolescents grow rapidly
- The fourth fallacious view is that adolescents are bothered by sex maturation and its problems.

3.5.1 Theories of Adolescence

Important theories of adolescence are discussed as follows:

1. **Comenius and Rousseau's Views:** Comenius was the first philosopher who recommended that schooling should be divided into four-to-six yearly periods.

   The periods proposed by him as follows:
   - The first period of schooling should provide training of different senses;
   - The second period of schooling should provide education for memory;
   - The third period of schooling encourage understanding and judgement ability in children; and
   - The fourth period of schooling should concentrate on harmonizing the 'will'.

   The theory has been elaborated in great detail by Rousseau in his book Emile. The theory of Rousseau exercised a great influence upon educational thinking and practice in several countries for centuries. The theory still has impact on stages of childhood and education.

2. **Hall's Theory :** The first psychologist who devoted much of his time in collecting data on adolescence was G. Stanley Hall. He stands half way between the philosophic fiction of the past centuries and the controlled observation and experimental approach of the present time. He analysed the self-expression of children and adolescents through essays and directed interviews.

   He wrote two volumes in 1904 on psychology of adolescence. He wrote:

   'The years from 8 to 12 constitute the unique period of human life. Height and weight are at their full-health is at its best. Activity is greater than even before. The child develops his own circle out of home-he develops peculiar endurance and resistance to fatigue. There is greater immunity to exposure, danger and accident. The development is salutatory. It is a period of storm nad stress. Important functions previously non-existent arise-every step of the upward way is strewn with wreckage of body, mind and morals. Sex asserts its mastery in field after field and works its havoc in the form of secret vices. The social instincts undergo sudden unfoldment and the new life of love awakens. Everything is plastic. Character an personality take form. Self-feeling and ambitions are increases. It is all marvelous new birth.'

   The findings of G. Stanley Hall had a great influence on the educational literature of the U.S.

3. **Hollingworth's Theory:** Hollingworth who conducted surveys on the developmental characteristics of children holds a different view than that of Hall's view. She holds the view that growth is a continuous process. Changes in adolescence do not occur all of a sudden but in a gradual way.

4. **Theory of Sigmund Freud:** Freud was a prolific writer on human behaviour and its problems. He developed a new concept of unconscious motivation which revolutionaized the theory and practice of psychology. His main emphasis was on sex. Freud developed distinct stages of psycho-sexual development of human personality. He shared Hall's attachment to past theories in his assumption of complete discrepancy in the characteristics of man and woman. Freud's shole interpretation of human nature was based upon the consequences which followed from an explanation of social functioning in terms of the rivalry of brothers for overthrowing of the father in his possession of the mother. He did not agree with G.Stanley Hall's concept that sexual instinct had its birth at puberty. Freud held that sex is present in the life of the child from his birth. He developed the theory of psycho-sexual development.

3.5.2 Physical Development

The most important single feature of adolescent development consists of the changes that take place in the young person's body. In adolescend, marked physical changes take place which have significant behavioural implications.

Physical features in adolescence may be discussed under the following heads:

- **Change in height:** Almost all boys and girls show a spurt in growth during adolescence which is preceded and followed by years of comparatively little increase. There is a sudden shoot-up in growth in height.
  During adolescence, the height increases by 15-20 percent. The height depends on the genes that you have inherited from parents. Right kind of diet, exercise and general health during these years also contribute to height.
- **Changes in bodily proportion:** There is general change in the proportions of various bodily parts. The different parts of the body grow at different rates and attain their maximum development at different times. The pelvis bone of girls broadens and their wrist becomes circular. The arms and legs grow in length and become finer. Boys develop round shoulders.
- **Voice:** Both girls and boys are affected by voice changes during their adolescence. In girls, the change in their voice is hardly noticeable because it becomes only slightly deeper. As compared to boys they have a high-pitched voice. In boys, changes that occur in the larynx cause their voices to deepen. The vocal cords of the larynx grow thicker and longer and when they vibrate the voices sound lower and deep. The larynx sticks out as a prominent Adam's apple in males.
- **Secondary sex characteristics:** The secondary sex characteristics develop during adolescence. Genital organs in boys grow in size. Testes usually grow earlier. In girls, sex organs acquire maturity. The growth of breasts and the widening of the pelvis in girls are among the physical developments that have significant influence on the adolescent girls' conception of her physical self.

- Hair growth: Both, boys and girls, have a body hair in the armpits (under the arms), in the pubic area (region above the thighs) and on the arms and legs. Boys also begin to grow facial hair, in the form of moustache and beard and hair on chest.
- Physiological changes: All internal systems such as respiratory, circulatory, digestive, blood pressure, heart and pulse-rate acquire their full growth. Brain is fully developed by the age of 18.
- Age of menstruation: The data on menarche has been collected in all parts of the world. It is generally believed that girls in tropical and sub-tropical countries mature earlier than cold countries. The average age of menstruation varies from 13 to 16 years.
- Relationship between physical and mental growth: It has been shown that the interests and behaviour pattern of children are closely allied with their pattern of physical and physiological development. Physical development has a psychological effect on his/her attitudes regarding himself/herself, and on the attitudes of others toward him/her. The physical development is an important factor in social development and approval. If the girl is ugly and underdeveloped., she tries to avoid social situation. If the girls is ugly and under-developed, she tries to avoid social situations. If the boy is physically handicapped or has some minor physical defects, then definitely his/her intellectual and social developments are affected.
- Increase in weight: During adolescence, the weight of a teenager almost doubles as the amount of muscles, fat and bones in their bodies change.
- Development of muscles: During puberty, the muscles of the body in increase in mass and strength, in both, boys and girls.
- Distribution of fat tissue: The distribution of fat in the body changes during adolescence. Boys add more fat to their trunks than to their limbs, whereas in adolescent girls there is increased distribution of fat in both. Among the limbs there is more fat added to their legs than to their arms as a result their waist becomes thin and the hips become more rounded. Adequate physical exercise should, therefore, be a part of daily life of an adolescent.
- Increased activity of sweat and sebaceous glands: During puberty, the sweat glands of both boys and girls become more active especially those present in the armpits and groin and on the palms of the hands and soles of the feet. When the oil glands get infected with bacteria, an out break of acne takes place. Most teenagers get acne on the face, neck, upperback, upper back, upper chest, shoulders and back.
- Breast development: The beginning of breast development is one of the earliest signs of puberty in girls. Breast is made up of fatty tissue and milk glands with ducts. The milk glands produce milk for the newborn child. Some adolescent boys also have breast development which is temporary. The swelling usually goes down within a year or so. In overweight boys, fat may also give the breasts an enlarged appearance.
- Physical activity and ability: The capacity to perform physical activities increases rapidly in adolescence.
- Changes in strength speed: There is a great increase in muscular strength in adolescence. The adolescents become more active in their work. Gils seem to mature earlier than boys in physical activity.
- Growth trend in motor performance: Espenschade conducted a study on boys and girls for a number of years on tests on running, throwing a ball and jumping. There was great difference in the performance of boys and girls. Boys are better. The boys are superior, particularly in activities which involve speed and muscular strength. Boys continue their interest in physical activities, while there is sharp decrease in the interest of girls. There is a sharp increase in

jumps and throwing events from 13 to 16 years. Many of the sex differences in motor and mechanical activities are not due so much to a genuine sex difference as to a difference in amount of interest, experience and practice.

There is a close relationship between motor performance and other traits. Popularity in adolescence is closely related to physical strength, and skill in athletic activities than to intelligence and school achievement. The cluster of physical traits as physical skills, bravery and strength show a high relationship in social situation and heterosexual relations.

These findings emphasize the importance of physical education an recreational activities for adolescents. The boys who have poor athletic abilities have poor social adjustment. They develop tension and conflict arising from inferiority.

3.5.3   Mental Cognitive Development

Another area of physical development is in the brain, especially the frontal lobe, which is the area for impulse control, judgement and the ability to plan. The frontal lobe develops during the teens and early 20s. An undeveloped frontal lobe helps explain impulsiveness, risky behaviour and moodiness among adolescents. In mid to late adolescence, young people often feel the need to establish their sexual identity by becoming comfortable with their body and sexual feelings. Through romantic friendships, dating and experimenting, adolescents learn to express and receive intimate or sexual advances.

As an adolescent boy/girl grows, he/she develops problem-solving skill and could be a part of decision-making in school or at home. He/She would be able to analyse information and experiences by critical thinking and handle a new situation through creative thinking. The adolescent boy/girl would indulge in planning and goal setting for long-term and short-term tasks. Yet, the same hormones that cause awkward and self-conscious at times, confused and insecure at other times. All these are normal feelings and the adolescent boy/girl gradually gets used to such emotions and gets over them.

All studies on the mental growth have reported that mental abilities increase with age. Mental development during adolescence accelerate on many intellectual fronts. The following are the characteristics of mental development in adolescence:
- Increased ability to generalize the facts: children usually generalize in relation to concrete objects. The intellectual development in childhood operates on a perceptual level but in adolescence the ability to generalize on conceptual level develops. The adolescent can generalize in an abstract way.
- Increased ability to understand: There is an increase in the ability to see relationship and to solve problems of increasing complexity and difficulty. The adolescent's depth of understanding develops.

- Increase ability to deal with abstraction : The adolescents can think not only in general terms, but also in abstract terms to a greater degree than children. They can think in terms of symbols rather than concrete things. Ability to carry on abstract thinking is not something that suddenly develops in adolescence. It is relative. This ability to comprehend and to communicate meanings in abstract qualitative concepts is an important aspect of intellectual maturity in adolescents.
- Development of memory and imagination: The memory in adolescence develops tremendously with the growth in vocabulary. The adolescents can imagine about a situation which is not physically present before them. Their long-term memory increases. They can retain facts for a longer period. They can anticipate future needs and can plan for it.
- Growth away from trial and error method: Trial and error is the primitive method to solve problems. During adolescence, an individual develops the capacity to cope with the situations through manipulation of pertinent factors. Teachers should encourage adolescents to develop the habit of substituting thought for trial and error method of solving problems.
- Ability of problem solving: The ability to solve problems increases in adolescence. Adolescents can solve problems with the help of symbols. They can deal with ideas that do not represent something in which a person is directly involved. They are able mentally to deal with events in a world that extends far beyond their own immediate sphere of activity.
- Increased ability to communicate with other persons: The adolescents on roads, in coffee houses, and tea stalls can be seen arguing for hours on topics of their interest.
- Identification with conditions and characters in the larger world: Another important change in intellectual orientation that takes place near the beginning of adolescence appears in the child's ability to identify with the circumstances and people outside his/her own immediate environment.
- Ability to make decisions: The individual has to make many decisions in his daily life. Decision-making ability is necessary for successful adjustment in life. During adolescence, we expect the growing child to gain increasing confidence in his/her own opinion. There is a certain amount of independence in thinking, a certain freedom in exploring and in weighing alternatives that is involved in the kind of maturity that enables one to make decisions on his/her own.
- Understanding of moral concepts: The child, without questioning the validity of moral training, obeys the moral code framed by parents, but as he enters adolescence he critically examines the moral code and asks a number of questions.
- Self-criticism and evaluation: Adolescents begin to evaluate their performance objectively but majority of adolescents do not achieve the mental maturity to do so. They either overestimate or under evaluate their performance.
- Increased rational self-control: Adolescents show more intellectual maturity to do a thing. They achieve rational self-control which is promoted by good mastery of developmental tasks which develops the sense of achievement and duty in them.

3.5.4 Emotional Development

C.T. Morgan emphasizing the importance of emotions in life writes that emotions are basic, primeval forces of great power and influence designed by nature to enable he organism to cope with circumstances which demand the utmost effort for survival or success or to add colour and spice to our living.

If there had been no emotion in life of the organism, life would have been without any aspiration. In absence of emotions, social and family life would have ceased and progress would have been checked. The word emotion has been derived from the Latin word 'emovere' which means 'to move out'. Emotion may be defined as the stirred up condition of the organism involving internal and external changes in the body. It is expressed in love, fear, anger, laughter and tears, etc. It involves feelings of jubilation or depression and impulse to action and awareness of perception.

Basically, human beings are creatures of feelings or emotions. Our emotions control our behaviour. Emotion in the organism is a dynamic internal adjustment which operates for the satisfaction and welfare of the individual. Adolescence is marked by heightened emotionally.

Causes of heightened emotionality
The following factors are responsible for increase in emotionality:
1. Change of roles in home, school and society.
2. Unfavourable relations in home;
3. Social expectations;
4. Difficulty in adjustment to the member of opposite sex;
5. Religion conflicts:
6. School failures;
7. Conflicts with friends and family members; and vocational problems

Characteristics of emotions in adolescence
The characteristics of emotions in adolescence are as follows:

- Complexity: By the time a child steps into adolescence, he/she experiences a number of emotional upheavals and storms. His/Her emotional development becomes complex by his/her experiences with his/her environment.The adolescent learns to conceal his/her true emotional experience.
- Development of abstract emotion: Generally, children show emotional expression in relation to concrete objects but adolescents can express their emotional feelings in relation to objects which are abstract or which are not present in concrete form.
- Widening of emotional feelings: As the child grows, he/she starts taking account of the past and imagines the future; and thus we can expect him/her to become more patient and able to tolerate delay. The child gets pleasures from what he/she expects in future. The sphere of his/her social relation increases. The child starts appreciating elder and younger people.
- Bearing of tensions: Adolescents develop competencies to bear the tensions in different social situations. The emphasis is on self-control. They feel a kind of inner freedom-freedom to feel and experience in an intimate personal way.

- Capacity of sharing emotions: In childhood, children are not able to control their emotions. Sharing of emotional experiences reaches its fullest development when and adolescent is able to relate himself/herself to another person in such a way that the satisfaction of the person is just as important as his/her own. It means he/she begins to love his/her neighbours as much as himself/herself.
- Expansion of loyalties: Emotional development begins from the home environment of the infant, and during adolescenc it is expanded beyond home and neighbourhood. These loyalties are identified with peers and leaders of various fields.
- Realism in emotional experiences: Now the child enters the period of reality. An adolescent can perceive and appreciate people around him. He recognizes the weakness and strength of one's character.
- Reviewing of hopes and aspirations: Adolescence is the period of life when one has high hopes and aspirations for his/her future life. Some adolescents work realistically to achieve their expectations and others do little to realize their hopes; they remain in illusion, and in the world of day-dreams and flights of fancy which make them unrealistic.
- Toleration of aloneness: The adolescents develop a feeling of loneliness. Sometimes, they like to be alone in their home.
- Externalization of feelings: The adolescent learns to externalize his/her feelings in the various situations of external environment he/she moves in. He/She can project his/her feelings on others.
- Increased compassion: Compassion means fellowship of feeling. It denotes an ability to enter into kinship with the feelings and impulses involved in any sort of emotional experience, whether it be joy or sorrow. To be compassionate, a person needs to be able to enter his/her own feelings and appreciate the emotional feelings of others.

Effects of emotions

Emotions have a profound effect on the life of an individual. They can make or mar one's life. There are two types of effects of emotions which are described below.

1. Good effects of emotions
- Source of motivation
- Source of enjoyment
- Source of strength and endurance to body
- Media of communication

2. Bad effects of emotions

Emotions also have damaging effects on the behaviour of an individual. The most damaging effect of emotions is on the physique of the individual. Constant emotional tension may cause lack of sleep, restlessness, headache, chronic fatigue, insomnia and lack of appetite.

3.55. Social Development

During adolescence, the following changes in social behaviour occur:
- The most marked change in adolescence is the place of the adolescent in family. In India, a special ceremony is held to celebrate the entry of child into a new social role. Parent's attitude changes and now they assign him/her social responsibilities. He/She is taken into confidence on important matters of the family.
- The circle of adolescent narrows down to a small group. His/Her interests become specialized.
- Adolescents start identifying himself/herself with adults and tries to do roles of the adult.
- In childhood, boys play with boys and girls with girls; while in adolescence, there is heterosexual trend in companionship. The adolescent boys and girls formtheir groups based on their common interests and goals. The social groups of boys and larger than girls because boys in our society have more freedom than girls. But very recently in big cities, a new trend toward giving more freedom to girls is emerging as a new social pattern among adolescent girls. The adolescent boys and girls have a variety of grouping such as chums, clique.
- Adolescents make friendship with those who conform to their standard and possess the personality traits they like. The number of friends decrease, but the affiliation becomes more permanent. There is interest to make friendship with the members of the opposite sex. The adolescent does not tolerate the interference of parents and other members in selecting friends. Sometimes because of his/her immature decision, the adolescent is bluffed inselection of friends. The friendship of this period tends to be permanent.
- The teacher should make an appraisal of student's social interests, social acceptance in classroom, socio-economic conditions, and organize activities to foster socialization.

3.5.5   Moral Development

The term moral is derived from the Latin word mores meaning manners, customs and folk ways. Morality is indissolubly linked with the social system. The child has to learn what is good and what is bad, what is right and what is wrong. He/She has also to learn his/her duty. All these terms imply clearly that morality has reference to social relationship and social process. Morality has two dimensions which are closely interlinked- (i) the rules of morality operate in the social context, and (ii) it is used to mean the pursuit of good life i.e., personal moral code.

Dimensions of moral development

Baqar Mehdi and B.P. Gupta in an NCERT publication entitled, Psychology of the Child and Curriculum (1983) observe, 'moral development of the child implies inculcation in the child a number of qualities for which curriculum provides ample opportunities'. According to them, following are some of the important moral qualities which need to be attended to in schools:
- Honesty in words and deeds
- Truthfulness
- Self-respect and a desire to respect others
- Righteouness

- Self control
- Duty consciousness
- Compassion

Jean Peaget (1932) used the interview method to find out the various stages of moral development of the child. According to him, there are four stages: (i) Anomy the first five years (ii) Heteronomy - Authority (5-8, years) (ii) Heteronomy – Reciprocity (9-13 years) and (iv) Autonomy – Adolescence (13-18 years).

3.5.6 Education of Adolescents

Adolescence is a period of transition from childhood which implies many developmental changes. S.R. Laycock has grouped the problems of adolescents under thefollowing major tasks:

- Adjustment at home,school,society, and with opposite sex;
- Freedom from home;
- Adjustment in suitable vocation; and
- Development of a sound philosophy of life

Charlotte Pope made and extensive study of the problem of adolescent boys and girls, and reported the following areas of problems:

- Teaching-Learning relationship in school: Most of the adolescents face a great problem in adjustment with teachers. Teachers are rigid, conservative and do not change their attitude. Some adolescents reported the problem of favouritism by teachers to some students. Students also resent the amount of homework given to them.

  It is unfortunate that curriculum in India is purely theoretical, and there is hardly active participation o nteh part of the students. Sitting passive in the class creates annoyance in adolescent boys and girls.
- Occupational adjustments:the greatest single problem which bothers the mind of adolescent boys in India is uncertainty for future vocation. The problem whatto do after study haunts the minds of unemployed adolescents. There is another black side of the picture when an adolescent sees thousands of of unemployed adolescents . The mind of the adolescent agitates against the social order, and he/she becomes rebellious. It is further unfortunate that most of the adolescents find themselves incapable of taking any independent means of livelihood.
- Financial problem: the problems of adolescents have multiplied with the socio-economic development of the country. The problem of money is a big issue. There are many activities of adolescents which involves money. The adolescent needs money. He feels ashamed of begging money from parents. Parents are conservative in providing money for extra activities to their sons and daughters.
- Home life relationship and social adjustment: Adolescents want more freedom to attend social functions, but parents donot permit them to move outside the home. This is particularly more so in case of girls from rural areas.

  The second important problem happens to be parents' high aspirations regarding achievement of their sons and daughters, and when they do not come up to their aspirations there is constant quarrelling among parents and adolescents.

  There is lack of understanding between parents and adolescents, regarding freedom and money. The parents treat the adolescent like a child. They never discuss problems freely with them.
- Health adjustment: Both boys and girls are very particular regarding their physical appearance. Those adolescents who are either underdeveloped or overdeveloped have great problem in adjustment. The important problem of this area are weak eyes, poor teeth, too short or too tall height, poor complexion, heads and frequent colds.

Sex education and adolescents

Social environment has many occasions when adolescents come to know about sex and its problems. The child comesto know about sex from the early age of six. Surveys made by Ramsey and Hamilton prove that children cannot be kept ignorant of sex knowledge.

UNIT 4 EXPERIMENTS

In this unit, we will be discussing a few experiments relevant to rest of the units.

4.1 FATIGUE: EFFECT OF RESPONSIES, ATTENTION AND DISTRACTION

EXPERIMENT 1: Span of Attention

Problem:

To assess span of attention for different types of stimuli with the help of fall door type tachitoscope.

Introduction:

Research on the span of attention began as early as 1885. Cattell inferred that the number of unrelated letters that could be processed simultaneously was limited to about four or five. These findings were replicated by Sperling (1960) who found that when a large number of alphanumeric items were presented tachistoscopicaUy, only about four or five items could be reported accurately. A wide range of explanations have been proposed for this performance limitation, which was termed as span of attention or span of apprehension. According to researchers the phenomenon can be explained by the limitations in the speed with which information can be transferred from one store to another, response-output interference, perceptual interactions among items in the display, and refractory periods in a *Information-transfer mechanism:* All of these proposals explain the phenomenon to some extent but they also may contain some element of truth, but all have some shortcomings.

Models of the span of attention fall into two general classes: processing-limitation models and storage-capacity models. Processing-limitation models assume that performance is limited by the speed or accuracy of some Process required for performing the task. Storage-capacity models account for the span of attention by assuming that performance depends on a storage buffer with a fixed capacity, and that when the number of items presented exceeds the capacity of the buffer, performance is impaired.

Studies have shown that the span of attention is determined jointly by the quality of perceptual information and the resources required to maintain information in visual working memory.

Based on the research above, one can hypothesize. Hypothesis:

Span of attention be more for meaningful material than for meaningless material. **Method:** *Sample:* The subject(s) should be described in terms of relevant demographic details such as age, class, parent's occupation, monthly salary, educational qualifications, hometown, district and socio-economic status.

Material:

(i) Fall door type Tachistoscope, (ii) Tachistoscope cards, and (iii) Data recording sheets, pencil, eraser

Description of Material:

The Fall door type tachistoscope is a wooden board with a slit in the centre and a falling door behind. This falling door will expose the stimulus (Tachistoscope cards) through the slit approximately at the rate of 1/1 Oth of a second by operating the lever.

Tachistoscope cards are sets of cards with drawings of black dots, meaningful words and nonsense syllables. These cards are useful in understanding the phenomenon of span for the dots, meaningful words and nonsense syllables. The set of black dots consists of 9 set of cards with dots ranging from 3 dots to 11 dots (four cards in each set). The set of meaningful cards will have 13 subsets with words ranging from 3 letters to 15 letters (four cards in each group). The set of nonsense syllables consists of 7 sets of cards ranging from 3 letter cards to 9 letter cards (four cards in each set).

Experimental Design:

Independent variable: The nature of the material (i) dots, (ii) nonsense syllables, and (iii) meaningful words.

Dependent variable: Span of attention or the number of dots/nonsense syllables/ meaningful words seen in one exposure.

Controls and Precautions:

• The experiment should be conducted in a calm and quiet atmosphere.
• The participant should be comfortable with the surroundings.
• The participant should be brief about the experiment thoroughly.
• The participant should be provided with a break of 10 minutes after every stimulus.
• The intensity of stimulus/illumination should be kept constant.
• The experimenter should be vigilant and record the data meticulously.

Procedure:

The participant will be briefed about the test and instructions will be provided as following:

(a) Instructions: 'This is a machine in which I will show you different things like dots, words, and non sense syllables for approximately 100 milliseconds. You have to see these things carefully from this slit (experimenter points at the slit of the tachistoscope). You have to tell me the numbers of dots you have seen, or read the words and nonsense syllables.'

(b) Administration: The experimenter will arrange the tachistoscope first for the dots, then for meaningful words and nonsense syllables. The experimenter will record the number of dots or words and non words spoken by the participant. Time of exposure for all types of stimuli is 100 milliseconds. It will shorten the reaction time of the eyes in shifting from one fixation point to another. We can assume that only one fixation means that there can be only one act or stroke of attention or at least the successive fixation characteristic of serial counting or spelling will not occur.

In the similar manner, group data may be collected and average score can be calculated for the group.

Result and Analysis:

Scoring:

The participant's estimation is defined as correct or incorrect in the following way— the same number of dots in a set of four cards is given to the participant that means we give four trials to the participant with the same kind of stimulus. We consider even two correct responses out of four responses in a set as a correct estimation. We will follow similar procedure for meaningful words and nonsense syllables. The span of attention/attention for number of dots, meaningful words, and nonsense syllables is found out by calculating the maximum number of dots counted or letters read.

Data for an entire group can be collected by conducting the experiment individually on each subject. At the same time, span of attention for a range for different types of stimuli can be explored. In case of any outliers in the group, the results should be discussed in view of psychological factors like area of interest, anxiety or other personality factors.

Discussion:

The hypothesis will be accepted or rejected on the basis of the results obtained. The participant's span of attention for dots, meaningful words, and nonsense syllable is estimated. The span of attention for a group of 10 participants is also calculated by calculating the range of the scores. Graphs to illustrate the results will be made

EXPERIMENT 2: Division of Attention
Problem:
To assess performance on two different types of tasks performed together.
Introduction:
One engages in multi tasking behavior every day, for instance talking on phone while driving, listening to the music while studying. Some people claim to have a mastery of performing various tasks simultaneously. Division of attention means a simultaneous focusing upon two separate activities. The activities should be separated from each other; like both of the activities should be combined in a group or one of the two activities should not be automatic.

According to Broadbent (1958), two stimuli or messages presented at the same time gain access to a sensory buffer at the same time. However, the physical characteristics of messages are used to select one message for further processing and all others are lost.

Later on, Treisman (1964) proposed that though physical characteristics are used to select one message for further processing but other messages are also given partial processing. She proposed a modified filter theory and named it as *Attenuation Theory*. She argued that some of the information of unattended message is attended.

According to all these theories one can assume that when two tasks are performed simultaneously, performance on them is affected because of the interference and complexity of mental processes active during that time.

Stroop tasks have shown that two different tasks produces interference in cognitive processing. Does it mean that multitasking produces less efficient results?

Stroop found that reading off names of colours written in different colours e.g., the word red written in yellow colour was easier and took a significantly shorter amount of time than saying aloud the colour with which the word was written. Stroop saw in his study, it is much harder to name the colour of the words than to simply say the literal sound of the intended word. This is because the brain is being tangled in a web of confusion; a concept known as interference is taking place. These words and their colours being seen are processed, but the brain must make a choice when examining these two features. Perhaps the feature considered more important, according to experience, is the easier to process. There are two noteworthy explanations that have been given for the Stroop Effect:

1. The Parallel Distributed Processing Approach: There is interference when two pathways (reading the word and naming the colour) are simultaneously activated. This interference causes conflict and a decision must be made, resulting in a weakened performance.

2. The fact that we have more practice (experience) in reading words than in naming colours: Reading words is an automatic process that is involuntary where as naming the colour is less automatic.

According to William James, attention is a process of selecting and processing multiple streams of incoming information. According to him selective attention is an information processing procedure that allows focusing on specific stimuli while preventing other distracting information to interfere. This procedure is necessary as we are not capable of processing all mcoming stimuli simultaneously and also need to detect relevant information as quickly as possible. Selective attention is therefore a performance limiting procedure as put forward by Kahneman's model of 'limited-capacity' central processor. According to his theory, this processor evaluates how demanding it is to process the stimuli and then adjusts attention accordingly.

Based on the above researches, hypothesis can be formulated.
Hypothesis:
Recognition of lines will be better when only one task is performed.
Method:
Sample: The subject(s) should be described in terms of relevant demographic details such as age, class, parent's occupation, monthly salary, educational qualifications, hometown, district and socio-economic status.
Material:
(i) The tachistoscope, (ii) tachistoscope cards, and (iii) Two sharp pointed pencils, record sheets
Description of material:
The tachistoscope will show stimulus of 3 to 6 short lines for 100 millisseconds. The sharp pointed pencils are used to apply pressure on fingers of the participant.
Experimental Design:
Independent variable: Number of activities separated from each other i.e., one activity is of tactile modality and other is about visual modality.
Dependent variable: Number of lines correctly identified.
The experiment will be conducted on two groups, namely (i) a control group and (ii) an experimental group. The control group will be asked to simply report the number of small lines that they see, whereas in the experimental group the subjects will be exposed to both the stimulus and will be asked to report both.
Controls and Precautions:
- The tachistoscope should be adjusted according to the participant's sitting position.
- The participant should be sitting comfortably.
- The pressure applied on the fingers should be at the same time when tachistoscope showing drawings.
- The pressure applied to fingers of both the hands should be contrastingly different.
- The data should be recorded meticulously.
(a) Instructions: The instructions given to the control group subjects will be as follows:

You are provided with this simple machine which shows drawings of short lines. You will be shown the drawings for 100 millisecond and you have to tell number of short lines present in the drawings. The instruction to the experimental group subjects will be as follows: You are provided with this simple machine which shows drawings of short lines. You will be shown the drawings for 100 milliseconds and you have to tell number of short lines present in the drawings. Simultaneously, pressure will be applied on one finger of each hand and you have to judge pressure on which finger was more. If something is unclear, you can ask me. Otherwise, we start with the experiment. **(b) Administration:** The experimenter will arrange the tachistoscope for the participant. The cards will be placed in the tachistoscope. The participant will told to look inside the tachistoscope and estimate the number of short lines shown in the drawing. In the experimental group, simultaneously, he/she will be given pressure on index finger of both the hands. The experimenter will choose on which hand he/she will give more pressure beforehand. Accordingly, the experimenter will apply pressure on the fingers while the participant looking at the tachistoscope. The trials can be given variably. Here, we may keep 20 trials.

Result and Analysis:

The result findings will be done by assessing correct or incorrect responses and comparing the performance of the two groups. The scores are recorded in the following manner:

1. The number of times both (perception of tactile and visual modality) were correct?
2. The number of one of them was correct?
3. The number of times neither of them correct?

The percentages of responses will be calculated.

Group data can also be utilized and results can be discussed with the help of average means. Appropriate graphs will be drawn to illustrate the findings based on which the hypothesis will either be accepted or rejected.

Discussion:

The results will be discussed in view of the findings that emerge and will be supported by earlier research in the area of division of attention.

Introspective Report:

Here the experimenter will ask the subject to give his experiences during the experiment in terms of difficulties, boredom, motivation, emotions, feelings and distractions.

EXPERIMENT 3: Span of Apprehension

The terms "span of attention" and "span of apprehension" are used interchangeably in psychology. These terms define the most number of objects which can be correctly perceived and recalled after a brief display. However, as a finer distinction span of apprehension refers to the basic processing capacity which influences span of attention.

Most of the works on span of attention focus around the works of Sperling (1960). In his experiments, Sperling presented a stimulus display. The stimulus consisted of alphabet arranged in a random order. The choice of the words was such that these did not make any sense on at the first sight. These random letters were exposed to the subjects for a very short span of time between 15-500 ms.

The subjects were and instructed to report as many articles as they could register during the brief display. They were also instructed to report their correct position.

It was reported that the subjects consistently reported an average of 4.3 letters.

For his part, Sperling took his results to show that subjects do consciously perceive at least nine letters, even if they can remember only around four. His opening question is whether, 'more is seen than can be remembered' (1960, p. 1) and, in the light of his data, Sperling gives an affirmative answer.

George A. Miller (1956), the cognitive psychologist, had demonstrated that the number of objects an average human can hold in working memory is 7 ± 2. However, Sperling demonstrated that 'more is seen than can be remembered'. It implied that although the subjects could consciously perceive nine letters, they could remember only around four.

Source: Adapted from http://www.ucl.ac.uk/~uctyibp/Attention%20and%20Iconic% 20Memory.pdf

4.2 MIRROR DRAWING

EXPERIMENT 4: Bilateral Transfer of Learning

Problem:

To measure bilateral transfer of motor skill from the preferred to the non preferred hand and vice versa in individuals as function of speed and accuracy.

Introduction:

Transfer of learning broadly refers to the transfer of one's knowledge and skills from one problem-solving situation to another. It often occurs without conscious thought.

The ability of the individual to apply previous experience on a new related experience is called transfer of learning. New skills and knowledge are developed when previously learnt responses and facts are linked to present ones. Cormier and Hagman, (1987) define transfer of learning as the application of skills and knowledge learned in one context, being applied in another context. Learning is meaningful when the past learning eases the progress of new learning.

Past learning and conditioning has a significant impact on the performance of new tasks. Transfer of learning from one performance situation to another performance situation is an important aspect of learning. Bilateral transfer is an aspect of the transfer of learning where training in one situation influences learning in some other situation. It also refers to transfer of a skill learned on one side of the body to the other symmetrical side of the body. So, for example, after training a task with the right hand there is an improvement in left handed performance. It is also known as 'cross transfer'. It is understood that learning on any one side of the brain, the same will be automatically transferred to the other hemisphere without any special training to it. This is called positive transfer of training. Starch (1910) introduced the use of a mirror drawing apparatus to study transfer of learning, hi the study, learning to transfer a star figure by right hand facilitates learning to trace the same figure by left hand which is an example of bilateral transfer of learning.

The different types of transfer of learning are explained as following:

(a) **Positive Transfer:** This is a situation where a previously learnt fact or information aids in the understanding of a new task. It also helps the learners to learn the new task in a better and effective manner.

(b) **Negative Transfer:** This is a type of learning in which previous experience impacts negatively on the new one. In this case, the understanding of past skills inhibits the mastering of new ones.

(c) **Zero Transfer:** This type of learning reveals no link between the previous learning and the recent learning. Based on this theoretical background, experiments can be conducted to study bilateral transfer.

One theory believes that Transfer occurs at a subconscious level. It is possible only if one has achieved 'automacity' of that which is to be transferred and if the transfer is to a problem that is sufficiently similar to the original one. The differences then are handled at a subconscious level aided by conscious thought. Studies show that motor learning can be transferred from one half of the body to the other. This form of learning occurs through a higher level cerebral mechanism.

Based on the studies discussed one can formulate the following hypothesis:

Hypothesis:
The speed and accuracy of the non-preferred hand will increase with practice of the preferred hand.

Method:
Sample:
The subject(s) here need to be described in terms of relevant demographic details such as age, socio-economic class, parent's occupation, educational qualifications, etc. Their preferred hand is to be noted especially as that is relevant to the experiment.

Materials:
(i) Mirror drawing apparatus
(ii) A star-pattern figure (iii) Stopwatch (iv) Drawing pins
(v) Graph papers

Description of the material:
The mirror drawing task was developed by Starch in 1910. In the apparatus presented to the subject, a mirror is fixed vertically and below the board there is space for placing the star figured paper. The star space is covered with a screen so that the subject may not see it directly. It can be seen only through the mirror.

A set of star patterns are provided by for use by the experimenter. These patterns have two outlines of the star between which the subject has to trace/draw a line.

Experimental Design:
Independent variable: Practise with the preferred hand.
Dependent variable: The speed and accuracy of the non preferred hand.
The ABA design is to be followed wherein:

A: The speed and accuracy of the non preferred hand will be assessed in terms of the number and types of errors made by the subject.

B: The subject will be asked to practice i.e., repeat the task with the preferred hand.

A: The subject will once again be asked to perform the task with the non-preferred hand and the speed and accuracy in terms of the time taken and number of errors made will be assessed.

Controls and Precautions:
The following controls and precautions to eliminate the affect of extraneous variables will be taken:
• The experiment will be conducted in a calm and quiet atmosphere.
• Three trials each with the non preferred hand will be taken before and after the subject practises with the preferred hand.
• Ten practice trials with the preferred hand will be given.
• The stopwatch will be used cautiously to measure the time taken by the subject to complete the task.
• After each attempt one minute's rest should be given to the subject.

Procedure:
The experimenter will make the subject sit comfortably and establish a good rapport and make him/her understand the purpose of the experiment.

As soon as the subject is ready, the experimenter should give the following instructions.

Instructions:
"When I say start, you will begin from the starting point and proceed on the directed path. You will move your pencil by seeing the star pattern in the mirror only. You will do it as fast as possible, but you will have to see that your pencil does not touch the boundary lines of the star figure, that you do not retrace the line and that you do not raise the pencil. You will have to reach the point from where you have started. You have to make three attempts in the beginning with the hand that you use normally and ten trials with the other hand. Lastly, you have to make three more attempts with the preferred hand."

Scoring procedure: The number of errors will be noted down in a tabular form. Errors would be:
(a) touching the line,
(b) re-tracing the line, and
(c) lifting the pencil.
The time taken in each attempt will be recorded.

Result and Analysis:
Showing Data

S.No.	Hand used	Time taken in seconds	Errors committed	Remarks
1.	NP hand			
2.	NP hand			
3.	NP hand			
4.	P hand			
5.	P hand			
6.	P hand			
7.	P hand			
8.	P hand			
9.	P hand			
10.	P hand			
11.	P hand			
12.	P hand			
13.	P hand			
14.	NP hand			
15.	NP hand			
16.	NP hand			

(i) The following means would be calculated:
(a) Time taken in their first three attempts by the non-preferred hand.
(b) Mistakes made in the first three attempts by the non-preferred hand.
(c) Time taken in the ten attempts by the preferred hand.
(d) Mistakes made in the ten attempts by the preferred hand.
(e) Time taken in three last three attempts by the non-preferred hand.
(f) Mistakes made in these last three attempts by the non-preferred hand.
(ii) Appropriate graphs to illustrate the differences between the first three and the last three attempts will be made.
(iii) The mean differences will allow one to conclude whether the hypothesis stated in the beginning of the experiment is accepted or rejected.

Discussion:
Depending on the acceptance or rejection of the hypothesis the results will be discussed in the light of previous research. The findings that emerge from the experiment have to be justified through findings of earlier research.

Conclusion: The conclusion will finally restate the acceptance or rejection of the hypothesis.

Introspective Report:
Here the experimenter will ask the subject to give his/her experiences during the experiment in terms of difficulties, boredom, motivation, emotions, feelings and distractions.
Another experiment on transfer of learning can be one involving the use of a maze.

EXPERIMENT 5: Transfer of Training in Maze Learning

Problem:
To demonstrate transfer of training in maze learning

Introduction:
Transfer of training refers to the process whereby the skills and abilities acquired in one task facilitates performance in a similar task. The role of previous learning has also been highlighted in earlier theories. One such theory was the Theory of Mental Faculties propounded by the Greek philosophers, including Aristotle. The theory believes that exercises and regular practice will strengthen the mental faculties like memory, judgment, thinking etc. Another Theory of Identical elements which was developed by Thorndike and Woodworm (American Psychologists) indicates that it is possible for an individual to transfer the prior skills and knowledge to recent ones because both experiences are identical (share things in common). This theory suggests that successful or effective learning will happen if there are connections or interrelatedness between the old and the new experiences. Based on the researches one can hypothesize.

Hypothesis:
Proficiency and accuracy in the first task will reduce the errors and time for the second task.

Method:
Sample:

The subject(s) here need to be described in terms of relevant demographic details such as age, socio-economic class, parent's occupation, educational qualifications, etc. Their preferred hand is to be noted especially as that is relevant to the experiment.

Materials:

(i) Two stylus mazes with the stylus, (ii) Blindfolding goggles or cloth, and (iii) stop watch, and record sheets.

Description of the material:

A stylus maze is a maze whose alleys consist of grooves which the subject traces by means of a stylus. For efficient recording, the score sheets should have a plan of the maze so that the experimenter can easily enter the subject's moves. Some mazes are equipped with sheets of carbon and white paper underneath the grooves so that the subject's moves are automatically recorded.

Experimental Design:

Independent variable: Practise with the preferred hand.

Dependent variable: The speed and accuracy of the non preferred hand.

The ABA design is to be followed wherein:

A: The speed and accuracy of the non preferred hand will be assessed in terms of the number and types of errors made by the subject.

B: The subject will be asked to practice i.e., repeat the task with the preferred hand.

A: The subject will once again be asked to perform the task with the non-preferred hand and the speed and accuracy in terms of the time taken and number of errors made will be assessed.

Controls and Precautions:

The following controls and precautions to eliminate the affect of extraneous variables will be taken:

• The experiment will be conducted in a calm and quiet atmosphere.

• Three trials each with the non preferred hand will be taken before and after the subject practises with the preferred hand.

• Ten practice trials with the preferred hand will be given.

• The stopwatch will be used cautiously to measure the time taken by the subject to complete the task.

•   After each attempt one minute's rest should be given to the subject.

Procedure:

The experimenter will make the subject sit comfortably and establish a good rapport and make him/her understand the purpose of the experiment.

As soon as the subject is ready, the experimenter should give the following instructions.

Instructions:

"When I say start, you will begin from the starting point and proceed on the directed path. You will move your pencil by seeing the star pattern in the mirror only. You will do it as fast as possible, but you will have to see that your pencil does not touch the boundary lines of the star figure, that you do not retrace the line and that you do not raise the pencil. You will have to reach the point from where you have started. You have to make three attempts in the beginning with the hand that you use normally and ten trials with the other hand. Lastly, you have to make three more attempts with the preferred hand."

Scoring procedure: The number of errors will be noted down in a tabular form. Errors would be:

(a) touching the line,

(b) re-tracing the line, and

(c) lifting the pencil.

The time taken in each attempt will be recorded.

Scoring procedure:

The observations are recorded in the following table.

Number of Trials and Time Taken to Reach Criterion

Trials	Subject 1				Subject 2			
	Maze 1		Maze 2		Maze 2		Maze 1	
	Time taken (sec)	Errors	Time taken (sec)	Errors	Time taken (sec)	Errors	Time taken (sec)	Errors
1								
2 '								
3								
4								
5								
6								
7								
8								
9								
10								

Total no. of trials	Total time	Total errors	Total time	Total errors	Total time	Total errors	Total time	Total errors

The experimenter can enter the subject's moves as he/she sees them being made. On that basis, the number of errors can be computed for each trial. An error is conventionally defined as (1) entrance into a blind alley, and (2) retracing in the correct path. In scoring the subject's performance, the experimenter should have a clear definition of error in mind. He/she must decide for example, how far the stylus must have been moved into a blind alley in order to be classified as an entrance.

The critical comparison is between performance on the first task and performance on the second task in terms of the total time taken to master the first and second maze and the number of errors made in both the mazes.

We compare the performance on the task learned first and on the task learned second with respect to the following scores:

1. Number of trials required to reach each criterion
2. Total amount of time required to reach each criterion
3. Total numbers of errors made before criterion was reached
4. Number of errors on each individual trial
5. Amount of time spent on each individual trial

Result and Analysis:

Learning curves are obtained by plotting time and errors against trial number. Comparison of two maze performances with respect to number of trials, number of errors, and amount of time required to reach criterion, allows us to tests for transfer

effects. If there is a significant difference in favour of the second task, transfer effects are positive, if the difference is in favour of the first task, the transfer effects are negative. Finally, if there is no significant difference, there is zero transfer. It is interesting to compare and contrast the transfer effects revealed by the three measures. Does one of them show greater effects than the others?

To quantify the amount of transfer, we compute the percentage of saving attributable to transfer. For example, it took 12 minutes to master the first task and only 8 minutes to master the second task. The difference is 4 minutes or 33.3% of 12. We conclude that the amount of transfer, as measured by time scores, is 33.3%. Similar saving scores can be computed for trials and errors.

Discussion:

If the time and error scores for the second task fall more rapidly than for the first, this difference may be ascribed to positive transfer effects.

The findings that emerge are to be related to the research done in this field. Earlier studies and experiments can be cited to support the findings.

Finally it may be useful to examine the subject as to the methods he employed in mastering the mazes. Did he use verbal self instructions such as 'first left, then right, then left again,' etc.? Did he rely on a visual scheme of the maze? To what extent did he explicitly verbalize the principles which made positive transfer effects possible? A careful examination of the subject's report may help to throw light on the factors responsible for the transfer effects.

Conclusion:

The conclusion would be based on the acceptance or rejection of the hypothesis on the basis of the results.

Introspective Report:

Here the experimenter will ask the subject to give his experiences during the experiment in terms of difficulties, boredom, motivation, emotions, feelings and distractions.

EXPERIMENT 6: Level of Aspiration

Problem:

To measure the level of aspiration and the subsequent achievement of a person.

Introduction:

Goals are set by individuals to receive a desired objective or purpose. The concept in psychology too carries connotations of purpose, objective and goal directed behaviour.

The systematic investigation of Level of Aspiration was by Hoppe in 1930. The term 'level of aspiration' was introduced by Dembo in 1931 and it was adopted as a quasi-tech term to refer to an individual's goals when engaged in a specific activity. Based upon the initial experiments, a standardization of experimental procedure to investigate the individual's goals was developed. Subjects were involved in a simple task as dart throwing, arithmetic problems etc.

The time taken to complete the task and the number of correct answers or any other quantifiable feature of performance was recorded. Basically, three types of information would be available for analysis—a performance score, a statement about future performance and sometimes an estimate of past performance.

The first theory accounting for behaviour in level of aspiration was by Frank in 1935. He proposed that the statement about the future (level of aspiration) to the past performance depends upon the relative strength of three needs: (a) the need to keep the level of aspiration high irrespective of performance, (b) the need to make level of aspiration approximate the level of future performance and (c) the need to avoid failure.

Explanation of response patterns observed in level of aspiration in terms of need or desire of success and failure and avoidance of failure were widely adopted. Common to all these was the assumption that level of aspiration is related to goals which one may or may not reach.

Method:

Sample: The subject(s) should be described in terms of the relevant demographic details such as age, qualifications, socio-economic background etc.

Materials:

(i) Rotter's Level of aspiration board, wooden rod, iron ball, and (ii) Recording sheets, pencil, eraser.

(c) Description of the Material:

The Rotter's level of aspiration is a wooden board, having one metre long and about 6" width. In the middle of the board there is a long groove end to end with one inch width. At the centre of the board in the groove there is a grading like scale with equal spacing and there are numbers written in white colour which are very much visible. The numbers start to increase from the bottom end from 0,1,2,3,4,5,6,7,8,9,10 and then going on decreasing order 10 to 9,8,7,6,5,4,3,2,1 and 0 at the upper end. There is a small hollow space for the iron ball to be placed. With the help of the wooden rod, the iron ball can be pushed upward through the long groove and the ball can easily, move from bottom end to the upper end. The ball can stop at any of the graded place numbered depending upon exerted on the ball. The position of the board should be parallel to the ground. This can be adjusted with the help of a clamp attached to the upper portion of the board. The wooden rod is one foot long and aboutl/2th diameter. The iron ball is normal size of %".

Procedure:
The experimenter should first set up the apparatus quite appropriately for the experiment. He/She should try and test whether the ball moves through the groove easily and also stops at a point steadily. He/She should prepare his/her record sheet for making entries of the trials.

(a)   **Instructions:**   The   experimenter   should   make   the   participant   to   sit   comfortably in   front   of   the   apparatus.   Then   the   experimenter   should   provide   following instructions to the participants.

"Now please look at this board. There is a long groove and there are also numbers. You will have to push the iron ball with this rod along the groove, so that the ball moves through the groove and stops against a number. If the ball stops at the number 10 you score 10. If it stops at 8 your score is 8. If the ball stops at zero or where there is no number or if it bounces off then your score is zero."

The experimenter should demonstrate some trials and hand over the rod to the participant.

"First you can have some practices. You can have 20 practice hits."

The experimenter should tell the participant the score he has made for every practice hit. On completing 20 practice hits the experimenter should tell the experiment.

"Now you can begin the test. I shall give you 20 trials. A trial constitutes five hits. Thus you will hit the ball 100 times. If you hit the ball every time at 10, then your score for a trial is 50 (5 x 10). If you hit the ball every time at zero, the score is zero. Before you start every hit call for a number you going to aim at and tell me and I will tell you the score you have achieved in that trails of five hits. After every trial of five hits I will tell you the score".

(b)   Administration: The   experimenter   should   note   down   at   once   the   number   called for   by   the   participant   and   also   the   number   he   hit.   At   the   end   of   five   hits,   he/she should work out the score for each trial and tell the participant.

Precautions:
• Participant should be comfortable.
• Participant should not be fatigued.
• Participant's interest level is very important.
• Stop watch should be used meticulously.

Result and Analysis:
The experimenter will work out the scores for all 20 trials performed by the participant and write them in Table. What the score participant aspired in each trial and what he performed in each trial also should be given in Table.

The Goal Discrepancy Score (GDS) is the difference between aspiration for a trail and the performance in the previous trial. The formula is:

GDS = AN (Aspiration) - PN-1 (Performance 1).

It is positive if the aspiration higher than the performance on previous trial. PN-1 refers to the performance in the previous trial.

There may also be difference between aspiration and the performance in the given trials. This score is called Attainment Discrepancy Score (ADS). The formula is:

ADS = AN (Aspiration) - PN (Performance)

It is positive if the performance is lower than the aspired score and if it is negative the aspired score is lower than the performance score.

For 20 trials, there are 19 goal discrepancy scores and 20 attainment scores. The mean score of all the 19 GDS and for all the 20 ADS should be worked out for the participant and should be presented in Table.

Find out the mean aspiration score of the participant for all 20 trials and his mean performance score and present them in Table.

Scores of Participants in Level of Aspiration Experiment

Nature of score	Trials																				TOTA	MEAN
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
AN of																						
PN of																						
GDS																						
ADS																						

Note: AN= Aspiration Score, PN= Performance Score, GDS= Goal Discrepancy score, ADS= Aspiration Discrepancy score

Collect the group data and present them in Table. In Table, present the mean aspiration scores, performance scores, mean GDS, and mean ADS.

Group Data in Level of Aspiration Experiment

S.No.	Name	Mean Aspiration Score	Mean Performance Score	Mean Goal Discrepancy Score	Mean Aspiration Discrepancy score	Aspiration Positive (+) Negative (-)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Mean Score						

Discussion:

Discuss the individual's Goal Discrepancy Scores and Aspiration Discrepancy Scores for each trial. Is he influenced by success? Does the level of success increase his/her level of aspiration or decrease his/her level of aspiration? If in spite of lower performance is he/she making the statement of the same aspiration level? State the main factors influencing the level of aspiration of the participant.
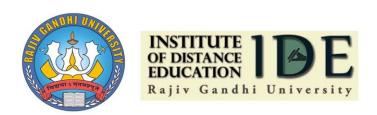
What is the mean value of aspiration in your participant? Is it above the group mean or below? What is the rank of GDS and ADS of your participant? Whose GDS and ADS are highest? Whose GDS and ADS are lowest? State the reasons for all these.

State whether your participant has positive or negative aspiration. Has he attained the positive ADS or negative GDS? How many in the group have positive GDS and positive ADS.

State the factors having influence in the level of aspiration.

Introspective Report:

Here the experimenter will ask the subject to give his/her experiences during the experiment in terms of difficulties, boredom, motivation, emotions, feelings and distractions.

Institute of Distance Education

Rajiv Gandhi University

A Central University
Rono Hills, Arunachal Pradesh