

MA (Sociology)
FIRST SEMESTER
MASOC 403



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METHODOLOGY OF SOCIAL RESEARCH

METHODOLOGY OF SOCIAL RESEARCH

PART-1

MA [Sociology]

First Semester

MASOC-403



RAJIV GANDHI UNIVERSITY

Arunachal Pradesh, INDIA - 791 112

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About the University

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

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

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

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

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

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

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

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

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

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

SYLLABI-BOOK MAPPING TABLE

Methodology of Social Research

Syllabi

Mapping in Book

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Characteristics, Types and Method:- Meaning, Characteristics and Objective of Scientific Research, Aims of Social Research

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Unit III Concept, Theory and Fact-I

Concept, Theory and Fact, Relationship between Theory and Fact, Inductive and Deductive Reasoning, Theory Building

Unit IV Concept, Theory and Fact-II

Objectivity-Subjectivity Debate, Value Neutrality, Validity and Reliability.

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INTRODUCTION

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Research is the search for knowledge or a systematic investigation in order to establish facts. The basic aim of research is to discover, interpret and develop methods and systems to advance human knowledge on diverse scientific matters. Social research refers to the conduction of research on various groups of a society by social scientists. Research methodology refers to the way research can be conducted. It is also known as the process of collecting data for various research projects.

Social research pertains to research carried out by social scientists on various facets of society. Research plays a very significant role in the field of social science. In order to study the importance and relationship between social science and research, social research is conducted or undertaken. The research that attempts to measure, describe, explain and predict the social and economic phenomena or social behaviour of human beings is known as 'social research'.

Methodology of social research is the science of studying how research is conducted scientifically. It helps to understand both the products as well as the process of scientific enquiry. A research process involves selection and formulation of a research problem, research design, sample strategy or sample design, as well as the interpretation and preparation of research report. Research can be undertaken in the form of descriptive/survey research, applied or fundamental research, quantitative or qualitative research, conceptual or empirical research, and other types of research.

A few important factors in research methodology include the validity and reliability of research data and the level of ethics. A job is considered half done if the data analysis is conducted properly. Formulation of appropriate research questions and sampling probable or non-probable factors are followed by measurement using survey and scaling techniques. This is followed by research design that may be experimental. This book deals with scientific and social research; concept, theory and fact; research design and sampling; methods of data collection; and scales and scaling techniques.

This book, *Methodology of Social Research*, is written in a self-instructional format and is divided into five units. Each unit begins with an Introduction to the topic followed by an outline of the Unit Objectives. The content is then presented in a simple and easy-to-understand manner, and is interspersed with Check Your Progress questions to test the reader's understanding of the topic. A list of Questions and Exercises is also provided at the end of each unit, and includes short-answer as well as long-answer questions. The Summary and Key Terms section are useful tools for students and are meant for effective recapitulation of the text.

UNIT 1 SCIENTIFIC AND SOCIAL RESEARCH -I

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Structure

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1.0 INTRODUCTION

Simply defined, research is a search for knowledge. One can also define research as a scientific and systematic pursuit of information on a specific topic. Scientifically, research can also be termed as scientific investigation. Thus, research and scientific enquiry can be considered synonymous. The only difference between the two is that while it is possible to employ scientific method without research, it is not possible to conduct any research without employing scientific methods. Thus, research is a more specialized form of scientific enquiry which in turn is the result of gathering of data, information and facts for the specific purpose.

Social research pertains to research carried out by social scientists on various facets of society. Research plays a very significant role in the field of social science. In order to study the importance and relationship between social science and research,

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social research is conducted or undertaken. The research that attempts to measure, describe, explain and predict the social and economic phenomena or social behaviour of human beings is known as 'social research'. In this unit, you will get acquainted with the meaning, characteristics and objective of scientific research, aims and types of social research, steps in social research, and the concept of hypothesis.

1.1 UNIT OBJECTIVES

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

- Explain the meaning of the term research
- Discuss the concept of scientific research and the relationship between social science and research
- Analyse the aims of social research
- Assess the types of social research
- Describe the major steps involved in social research
- Assess the need for hypotheses formulation

1.2 MEANING OF RESEARCH

Research in common parlance refers to the search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation. According to the *Advanced Learner's Dictionary of Current English*, 'Research is a careful investigation or enquiry, especially a thorough search for new facts in any branch of knowledge.' Redman and Mory (1923), author of *The Romance of Research*, defined research as 'A systematized effort to gain new knowledge'. Some people consider research as a voyage of discovery that involves movement from the known to the unknown.

Research in a technical sense is an academic activity. Clifford Woody, a professor of Education, defined research as an activity that comprises defining and redefining problems, formulating a hypothesis; collecting, organizing and evaluating data; making deductions and reaching conclusions; and carefully testing the conclusions to determine if they support the formulated hypothesis. D. Slesinger and M. Stephenson, in the *Encyclopaedia of Social Sciences*, defined research as 'the manipulation of things, concepts or symbols for the purpose of generalizing, extending, correcting or verifying the knowledge, whether that knowledge aids in the construction of theory or in the practice of an art.' Research is thus an original contribution to the existing stock of knowledge making for its advancement.

1.2.1 Definitions of Research

Grinnell (1993:4) writes 'A research is a structured inquiry that utilizes acceptable scientific methodology to solve problems and creates new knowledge that is generally applicable.'

Burns (1994:2) defines research as 'A systematic investigation to find answers to a problem.'

According to Kerlinger (1986:10), 'Scientific research is a systematic, controlled empirical and critical investigation of propositions about the presumed relationship about various phenomena.'

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Bulmer (1977:5) states 'Sociological research is primarily committed to establishing systematic, reliable and valid knowledge about the social world.'

Ranjit Kumar (1999:7) holds that a research should have the following characteristics. It should be:

- **Controlled:** The concept of control implies that in exploring causal relationship among variables, the study is set in such a way that extraneous factors affect the relationship minimally.
- **Rigorous:** The research must be carried out rigorously and scrupulously and it should be ensured that the procedures followed are relevant, appropriate and justified.
- **Systematic:** This refers to the logical sequence that is undertaken in an investigation.
- **Valid and verifiable:** The conclusions drawn on the basis of findings should bear the imprint of validity and should be verifiable by others.
- **Empirical:** Conclusions reached during research are based on evidences gathered from real-life experiences and observations.
- **Critical:** The methods employed and procedures used are critically scrutinized. The processes and methods of investigation adopted should be very lucidly stated and explained and should withstand critical scrutiny.

1.2.2 Principles of Research

The basic principles of research include a systematic process to identify a question or problem, set forth a plan of action to answer the question or resolve the problem, and meticulously collect and analyse data. In conducting any research, it is crucial to choose the right method and design for a specific researchable problem. All research is different. However, the following factors are common to all good pieces of research:

- It is based on empirical data.
- It involves precise observations and measurements.
- It is aimed at developing theories, principles and generalizations.
- There are systematic, logical procedures involved.
- It is replicable.
- The findings of the research need to be reported.

1.3 SCIENTIFIC RESEARCH

Science refers to organized knowledge, but this knowledge and these facts are seldom conclusive. New experiences and additional information constantly alter the previous findings and replace them with generalizations that confirm the latest findings.

The same is the case with social sciences. The scientific method can also be applied to subjects in social sciences.

Steps in Scientific Method

The steps involved in the scientific method are as follows:

- Collection of data as per the problem in hand, according to some adequate plan and their systematic observation.

Check Your Progress

1. What is research?
2. What are the basic principles of research?

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- Observations are made with a well-defined purpose and they are recorded in definite terms.
- Classification and organization of data on the basis of similarities, variations, activities, causes and results.
- Generalization of data for the purpose of formulating principles and theories. The principles and theories must be specifically defined so that it can solve the problems in the related field.
- Verification of generalizations through controlled experiments by tested prediction of results and by repetition of experiments. Correlation coefficient of original as well as verification of results is also calculated and probable errors are estimated. It is also determined whether the error lies in procedure or apparatus.
- Assumptions and limitations are noted down on the basis of verification of results.
- Reporting the research in detail.
- Announcement of the results before the general public for practical use.

Steps in Scientific Process

The steps involved in a scientific process are as follows:

- (i) Purposeful observation:** Observation should be accurate and extensive, and it must be done under various controlled conditions.
- (ii) Analysis-synthesis:** This includes the following:
 - The essential elements in a problematic situation must be selected by analysis.
 - Similarities as well as dissimilarities must be isolated.
 - Exceptions are to be given special attention.
- (iii) Selective recall:** A wide range of experiences is essential.
- (iv) Hypothesis:** It is nothing but a tentative solution to the problem. There may be more than one solution depending on the nature of the problem.
- (v) Verification by inference and experiment:** Here, only one variable is manipulated and judgment is made on the adequacy and accuracy of data.

1.3.1 Social Science and Research

Research plays a very significant role in the field of social science. In order to study the importance and relationship between social science and research, social research is conducted or undertaken. Research that attempts to measure, describe, explain and predict the social and economic phenomena or social behaviour of human beings is known as 'social research'.

One of the main objectives of conducting social research is to find information about the behaviour of an individual and solutions to the problems related to human relations. The outcome of social research provides the following benefits:

- It helps professionals in earning their livelihood.
- It helps students in knowing how to write a report for various findings.
- It helps philosophers to think on wider new perspectives.
- It helps in developing new styles for creative work.

In order to conduct social research and examine the social life of human beings, social scientists use different methods. Quantitative and qualitative research are the two

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methods of research that are generally used by social scientists to conduct a research. In quantitative method, numerical data is collected and then analysed in order to measure the social phenomena. Qualitative method is basically the study of data, such as words, pictures and objects. However, the data collected with the help of this method is not very effective and cannot be generalized very easily.

Social research is very helpful for a country as it helps the government to explore the following things:

- Social and economic structures
- Social attitudes
- Social values and behaviours
- Factors motivating individuals and groups of a society

Researchers share a close relationship with government analysts, such as economists, statisticians and operational researchers. The relationship between researchers and government analysts is essential in order to find out high quality research data. Social research also informs about development, implementation and evaluation of a wide range of government policies.

Social research also helps to examine the consequences of government policies and economic changes in an organization, and the effects of globalization and its impact on small-scale and cottage industries.

1.3.2 Objectives of Scientific Research

Research is a systematic process for developing a theory by applying scientific methods. It is an impartial, objective, empirical and logical analysis and recording of controlled observation that finally leads to the development of a theory, principles, laws, etc., and helps us to predict about the phenomenon in future.

A research is said to begin with a question or a problem. The purpose of a research is to find out solutions through the application of systematic and scientific methods. Thus, research is a systematic approach to a purposeful investigation.

The main aim of research is to uncover answers to questions by applying scientific procedures. Research aims to discover hidden truths. While each research initiative has a particular purpose, the objectives of research can be broadly characterized as follows:

- **Exploratory/formulative research:** It attempts to get familiar with a concept or to develop new insights into it.
- **Descriptive research:** It seeks to accurately portray the key characteristics of an individual, a situation or a group.
- **Diagnostic research:** It establishes the frequency with which an event occurs, or the frequency with which it is associated with something else.
- **Hypothesis-testing research:** This type of research tests the hypotheses of a causal relationship between variables.

1.3.3 Characteristics of Good Research

The process of research helps to increase the creative ability of a decision-maker. The various characteristics of research are as follows:

- **Interdisciplinary team approach:** This approach is based on the principle of using expertise and experience of different personnel working in different disciplines

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within an organization. An individual cannot be an expert in all the areas of operation. So, researchers take help from other experts, who are specialists in their respective fields. Under interdisciplinary team approach, an expert may use old solutions, which were used in the past as research material for finding the most appropriate solution to a problem.

- **Methodological process:** The researcher uses scientific methods and techniques to provide optimum solution to problems. The scientific methods include observing and defining a problem and formulating hypothesis related to the results of the scientific methods and techniques. If the hypothesis is accepted, its results should be executed in an organization; but if the hypothesis is not accepted, another hypothesis is formulated.
- **Objectivistic approach:** The aim of an organization is to have optimal solutions to various problems. It is essential to measure the desirability of a solution for achieving the organizational objective. This measured desirability helps in comparing the alternative courses of action with respect to their outcomes.
- **Economical in nature:** In an uncertain and complex situation, research helps in reducing the costs of inventory, thereby improving profits. For example, in inventory control, research can provide scientific rules for reducing acquisition costs and inventory-carrying costs.

The qualities of good research are as follows:

- **Good research is systematic:** This means that the research lays out clear steps in a specified sequence in compliance with well-defined rules. Being systematic does not mean that the research cannot be based on creative thinking. On the other hand, it dramatically reduces guesswork-based and intuitive conclusions.
- **Good research is logical:** This implies that the use of sound logic provides a foundation for reasoning, induction and deduction, which are of great significance for carrying out high quality research. Induction entails reasoning from a part to the whole, while deduction is the process of reasoning, wherein a premise is driven to a conclusion which is based on that very premise. Inductive and deductive reasoning is further discussed in the next unit. In fact, logical reasoning leads to more meaningful research and better eventual decision-making.
- **Good research is empirical:** This means that research is related to one or several aspects of a real situation and uses concrete data which provides a basis for external validity to the research results.
- **Good research is replicable:** Good research allows for research results to be verified by replicating the study, thereby building a sound basis for decisions.

Further, Best and Kahn (1992) have summarized the main characteristics of research as follows:

- Research seeks to find a solution to a problem. In this objective, it could answer a question or even determine the relationship between several variables.
- Research creates generalizations, principles and theories that enable the prediction or anticipation of future occurrences. Research studies specific objects, groups or situations and then applies these characteristics observed to a larger population than the sample observed. Research goes beyond just simply retrieving or gathering

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information. There are many schools where the research teams gather and tabulate statistical information. This information can be used for decision-making, but it is not necessary to do so.

- Research is based on observations or empirical evidence. There are many questions which are interesting or relevant but, since they cannot be observed, they do not become research procedures. Research does not accept revelation or dogma as a basis for establishing knowledge. Research only accepts that which can be verified by observation.
- Research requires accuracy of observation and description. Researchers rely on quantitative or numerical measuring devices which are accepted as precise means of description. They identify or create appropriate data gathering instruments or procedures and employ effective mechanical, electronic, or psychometric techniques to improve human observation, recording, computation and analysis of data.
- Research entails obtaining new data from first-hand sources, or uses existing data towards a new purpose. Teachers often guide their students to undertake a project which requires them to write a paper detailing the life of a prominent person. The students consult encyclopaedias, books, or periodicals and summarize the information in writing. This is not research, the information is not new. Simply rewriting or representing what is already known may be a valuable learning experience, but it is not research. It does not provide any new information.
- Research may sometimes appear to be random or unsystematic. However, it is actually always based on carefully designed procedures and rigorous analysis. Although researchers may sometimes employ trial and error methodologies, research is not a blind, random investigation, where the researcher is just experimenting to see what happens.
- A good researcher requires significant expertise. He/She is already aware of what is known about the problem including the investigations carried out by others. The researcher familiar with the related literature and also understands the terminology, concepts and technical skills necessary to thoroughly assess the data that he/she has gathered.
- Researchers must apply objectivity and logic and must also remove all their personal biases. They must employ all possible tests in order to comprehensively validate the procedure followed, the data sourced, and the results or conclusions that have been arrived at. Researchers should not make any effort to be additionally persuasive in order to prove an emotionally held conviction by them. Their focus must be on testing, and not on proving the hypothesis. Total objectivity is just as rare as absolute righteousness, and therefore, researchers must not allow bias or emotion to affect their analysis.
- Research involves the quest for answers to unsolved problems. Pushing back the frontiers of ignorance is its goal, and originality is frequently the quality of a good research project. However, previous important studies are deliberately repeated, using identical or similar procedures, with different subjects, different settings, and at different times. This process is a replication, a fusion of the words, repetition and duplication. Replication is always desirable to confirm or to raise questions about the conclusions of a previous study.

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- Research must be carried out patiently and not in a rushed manner. Its outcome and result are mundane rather than spectacular, and the research team must be prepared to face disappointment in the pursuit of answers to their unanswered questions.
- The process and outcomes of research are meticulously recorded. Every key term is defined, restrictive factors are acknowledged, procedures are carefully described, all references are recorded, results are objectively documented, and the final outcomes are presented with caution and restraint. The final research reports and supporting data are made available for associates and other scholars to study, analyse, evaluate and even replicate.

1.3.4 Research Approaches

Almost all types of research primarily follow the two basic approaches depending on the need of quality and the amount of data available. These two approaches are quantitative approach and qualitative approach.

1. Quantitative Approach

This approach involves the creation of data in quantitative terms. It can be further classified into the following approaches:

- **Inferential approach:** It is used to form a database to infer features or relationships of population. This usually means a survey research in which a model of population is studied.
- **Experimental approach:** This approach attempts to establish a cause-effect relationship among the groups of subjects that make up the research study. It is characterized by a greater control over the research environment where some variables are operated to scrutinize their effect on other variables.
- **Simulation approach:** This entails the creation of an artificial environment within which relevant information and data can be produced. It is useful in building models for understanding future conditions.

2. Qualitative Approach

This approach is concerned with the subjective assessment of human attitude, opinions and behaviour. It generates results either in non-quantitative form or in non-numerical data. This technique focuses on group interviews and in-depth interviews in its approach. It can be further classified into the following approaches:

- **Ethnographic approach:** This is concerned with studying an entire culture. The researcher studies an integral cultural group in a natural setting over a specific period of time. By a cultural group, we mean any group of individuals, who share a common social identity, location or any other characteristics of interest. For example, an ethnographic study of the hurricane victims in crisis, a group of children in kindergarten, or a cultural group in tribal India.
- **Phenomenological approach:** This focuses on the subjective experiences of people over a long period of time. It aims at understanding the 'lived experience' of the group of individuals being studied.
- **Field research:** This is a broad approach to qualitative research that facilitates collection of data. The basic idea involved in this research is that the researcher goes into the field to observe the phenomenon in its natural state. He/She takes extensive field notes, which are then coded and analysed in various ways.

1.3.5 Types of Research

The types of research depend on the field in which the specific research study is performed. The different types of research are as follows:

1. Experimental Research

Experimental research involves conducting tests in a simulated or real space and time. The emphasis of most experimental research is on establishing cause and effect relationships, acquiring sensitivity of the dependent factor on an independent factor, keeping other independent factors under control and finding the conditions under which reactions take place.

The main features of experimental research are: (i) isolation of factors into dependent, independent and catalytic, (ii) replication of the experiment to ensure the reliability of the results, and (iii) measurement of the result, i.e., inputs, conditioning environment and output. The hallmark of experimental research is precision and accuracy. Everything is structured, controlled, monitored, measured and reported.

There are different types of experimental research. These are: (i) natural or uncontrolled as in the case of natural phenomena where only observation of the phenomena is done, results analysed and conclusions drawn; (ii) the laboratory-situation research where a simulated environment is created with the input and conditioning variables manipulated to find the output behaviour; and (iii) field experiment where research is conducted in a social setting, with the researcher having a low manipulative power as far as the input variables and conditioning factors are concerned.

The first type of research is used in the case of totally uncontrollable phenomena like gravitational force, weather, astronomical or celestial events. The second type is used in physical, biological and psychological sciences. The third one is based on management, business and social sciences.

There are several experimental designs like: completely randomized design, completely randomized block design, Latin square design, cross-sectional design, longitudinal design, etc.

Experimental research is considered to be most scientifically valid. The purpose of experimental research is to establish 'cause and effect' relationships from observed findings. The effects of specific variables in a process can be understood by keeping other variables constant or using controlled experimental research. This is practised till the design and execution of the experimental hypothesis provides results. Research and marketing managers need to be confident about the conclusions drawn from the research.

Experiments call for selecting matched groups of subjects, subjecting them to different treatments by controlling extraneous variables and checking whether observed response differences are statistically significant. To the extent that extraneous factors are eliminated or controlled, the observed effects can be related to variations in the treatment. For instance, Indian Airlines might introduce in-flight Internet service on one of its regular flights from Delhi to New York. It might charge ₹1,200 one week and only ₹700 the next week. If the plane carried approximately the same number of first class passengers each week and the particular weeks made no difference, any significant difference in the number of calls made could be related to the difference in price charged. Trying other prices and including other air routes could elaborate the experimental design.

Experimentation is not easy to define. In most circumstances, experiments must create artificial situations so that they can obtain the particular data needed and can

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measure it accurately. Artificiality, in general, is the essence of an experimental research. Experimental research is commonly used in sciences, such as sociology, psychology, physics, chemistry, biology, medicine, etc.

2. Ex-post Facto Research

Ex-post facto is a term used to define an action taken to change the effect of a set of circumstances. This action relates to a past endeavour and bases the new effect on the same set of circumstances existing at that time. Ex-post facto research is similar to experimental research, which is conducted to deal with situations that occur in or around an organization. Studies that investigate possible cause and effect relationships by observing an existing condition or state of affairs and searching back in time for probable causal factors are collectively known as 'ex-post facto research'.

The characteristics of an ex-post facto research are as follows:

- Exploration of possible causes and effects
- No manipulation of independent variables as it has already been applied
- Control on comparison group
- Intact groups are used
- Researcher takes the effect-dependent variable and examines it retrospectively
- Flexible by nature

This research is used in one or more of the following cases:

- Where more powerful experimental designs are not possible to apply.
- When one is unable to select, control and manipulate the factors necessary to study the cause and effect relationship directly.
- When control variables, except a single independent variable, may be unrealistic and artificial.

Advantages of ex-post facto research are as follows:

- Shows a correlation where more rigorous experimentation is not possible
- Is an exploratory tool
- Useful to avoid artificiality in the research
- Shows cause and effect relationships

Disadvantages of ex-post facto research are as follows:

- Lack of control for independent variable and randomizing subjects
- Never certain if causative factor has been included or identified
- Relationship between two factors does not estimate cause and effect
- May be regarded as too flexible

3. Survey Research

A survey is a fact-finding study. It is a method of research involving the collection of data directly from a group of people or a sample at a particular point of time. The purpose of survey is to provide information, explain phenomena, make comparisons, etc. It is concerned with cause and effect relationships that can be useful for making predictions, knowing about customer's knowledge, beliefs, preferences and satisfaction, and measuring all these magnitudes for general population.

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A company, such as Air India, might prepare its own survey to collect the information it needs or it might add questions to an anthology survey that carries the questions that are common to several companies. It can then provide services at a much lower cost. It can also put cross questions to an ongoing consumer panel run by itself or another company. A mall intercept study may also be carried out by having the researcher approach people in a shopping mall and asking them questions. The survey methodology is popular among students for two reasons. First, it seems familiar and easy to conduct. Most students take part in either an interview or questionnaire survey and many conduct a survey in their secondary school days. Second, people are often interested to respond to questions therefore the survey is a useful tool for gathering a wide range of information.

A survey collects information from a sample of the population or sometimes, the organizations that are interested in participating in it. This may involve gathering information either at one point in time, that is, cross-sectional studies or following a group of people over a period of time, that is, longitudinal studies. Most of the non-academic surveys, such as surveys in market research, are of the first type. The type of information that can be gathered from people includes factual information, their level of knowledge, attitude, personalities, beliefs and preferences.

Steps in conducting a survey

Following are the steps in conducting a survey:

- Clarify the purpose
- Define the study population
- Sample selection and estimating the sample size
- Decide what information to collect
- Decide how to measure the information
- Collect the data
- Record, analyse and interpret the data

Clarifying the purposes

It is important to be absolutely clear and explicit about the purposes right at the beginning. Surveys can be used for the following two purposes:

- To know how common a characteristic is, that is, a descriptive survey.
- To learn something about the causes for these characteristics, that is, analytic survey.

Defining the study of population

The next step is to define the exact subject of the study. It is vital to ensure that the subject of study relates to the purpose of the survey. This usually includes specific personal criteria, time and place.

4. Historical Research

Historical research turns to history or the past to study the patterns there, their impact on the present, evolutionary process and so on. In a sense most of the researches are historical in nature because it uses data and information pertaining to the past. Hence, research depends heavily on the past. How deep should research go into the past? This is a relevant question right now. Perhaps historical research concentrates on the deep distant past.

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Enquiry into the trade, commerce, business and economy of Ancient India (5000–3500 BC), the administrative system during the reign of Ashoka, etc., are truly part of historical research. Historical research requires extraordinary skills on the part of the researcher to live the distant past, to visualize the environment, to analyse and synthesize the undercurrents and overtones of the past.

We can also say that historical research studies the bygone social effects that may have given rise to current situations. The study of the current state of Indian labour based on the past labour union movements to formulate the Indian labour policy is an example of historical research.

Some other types of research are described below:

- (i) **Pure/Fundamental research:** This research is mainly concerned with identifying certain important principles in a specific field. It intends to find out information that has a broad base of application. The purpose of this kind of research is to develop theories, laws or principles by observing broad generalizations or phenomena. These theories or laws were previously unknown to anybody, e.g., discovery of the Law of Gravity by Newton, Law of Operant Conditioning by Skinner, and so on. Other examples of fundamental research are John Robinson's Imperfect Competition Theory in economics and Maslow's Hierarchy of Needs Theory in motivation, etc.

Researchers select the problem from any source, which generally is not traditional. When the researchers find the solution to the problem through their research, they come to know that they have done something useful economically or socially.

- (ii) **Applied research:** This research aims at finding a solution to an immediate problem faced by a society or an industrial organization. It is supposed to discover a solution to some basic practical problems. It suggests corrective methods to minimize a social or business problem. Applied research is an application of pure research and its new interpretation in a different situation. Sometimes two pure laws are compared and a third new law emerges. This is called 'applied research'.

Both the above researches use the scientific method of reflective thinking but their objectives are different. Problems involved in applied research have definite relevance to human aspirations; but pure research is not directly related to specific human needs, at least in the beginning.

Steps involved in applied research are as follows:

- A growing concern is studied and points of weaknesses in the system are isolated.
- Some of these weaknesses are selected for investigation.
- Investigations are followed by solution either in the laboratory or in the field.
- Solution is modified and installed so that it may work in practice.
- Solution must be maintained by planning it in the organization so that it may become a permanent part of the system.

- (iii) **Action research:** It is 'research during action', such as observation of students in a classroom. Its findings are to be related in terms of local applicability. It means action research is generally used to solve local problems. As a result, its findings cannot be generalized beyond a particular setting. Its purpose is to improve school practices and educational outputs.

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- (iv) **Formulative/Exploratory research:** It helps examine a problem with suitable hypothesis. This research on social science is mainly significant for clarifying concepts and innovations for further research. The researchers are mainly concerned with the principles of developing hypothesis and testing the hypothesis with statistical tools.

- (v) **Case study:** This research undertakes intensive research that requires a thorough study of a particular unit, such as industrial or banking for data collection. Unit 4 will further deal with case study and the methods of data collection.

Besides these, there are several other types of research, such as evaluation research, assessment research and comparative research.

It is difficult to categorize a particular research under any major head. Irrespective of the nature and method of research, the research problem is essentially treated in an interdisciplinary manner. Interdisciplinary treatment means borrowing of an idea from related disciplines connected with the research topic for more authenticity. For example, management is not an individual discipline in its own right; rather, it requires an integral approach of various disciplines like finance and human resources.

1.3.6 Nature and Scope of Research

A good and effective research is identified by its nature, which signifies its focus on the research topic, systematic way of implementation, control over variables, etc. The nature of a good and effective research is as follows:

- **Objectivity:** A good research is objective in terms of offering solutions to the research questions. This calls for planning and creation of suitable hypothesis to avoid lack of relationship between the research questions and hypothesis.
- **Control:** A good research is capable of controlling all the variables. This necessitates randomization at all stages and ascertains sufficient control over the independent variables.
- **Universality:** A good research should have almost the same result by using identical methodology so that the result can be applied to similar situations.
- **Free from personal biases:** A good research is free from the researcher's personal biases and is based on objectivity and not subjectivity.
- **Systematic:** A good research has several well-planned steps that are interconnected and logical.
- **Reproductivity:** A researcher while conducting a research is able to get approximately the same results by using an identical methodology of conducting investigation.

Research plays an important role in many application areas. Some of them are as follows:

- **Finance, budgeting and investments:** This includes the following activities:
 - o Cash flow analysis, long-range capital requirement analysis, creation of investment policies and dividend policies
 - o Creation of credit policies, credit risks and account procedures, such as deposits and withdrawal

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- **Purchasing, procurement and exploration:** This includes the following activities:
 - o Determining the quantity and time of purchase of raw materials, machinery, etc.
 - o Defining the rules for buying and supplying products under varying prices
 - o Determining the quantities and timings of purchases of finished products
 - o Formulating strategies for exploration and exploitation of new material sources
- **Production management:** This includes physical distribution of products, facility planning and manufacturing planning as follows:
 - o **Physical distribution:** It is further divided into the following elements:
 - (a) Location and size of warehouses, distribution centres, retail outlets, etc.
 - (b) Distribution policy
 - o **Facility planning:** It is further divided into the following elements:
 - (a) Production scheduling and sequencing of available resources
 - (b) Project scheduling and allocation of resources
 - (c) Determining the optimum production-mix
 - o **Manufacturing planning:** It is further divided into maintenance policies and preventive maintenance.
- **Research and development:** It includes the following activities:
 - o Determining the areas of concentration of research and development
 - o Reliability and evaluation of alternative designs of research and development
 - o Control of developed projects
 - o Coordination of multiple research projects
 - o Determining the time and cost requirements

1.4 AIMS OF SOCIAL RESEARCH

The subject matter of sociology is society. Sociologists study man's social behaviour in a variety of contexts. They use a number of methods in social research including 'comparative method', 'participant observer method', 'community studies', etc. Descriptive and explanatory research aims only at describing, in detail, a situation or set of circumstances. On the other hand, action research refers to 'that is done when some reform or change has been introduced. Its purpose is to monitor the effect of the change and to decide whether it has achieved what it was supposed to achieve.'

Many eminent sociologists defined statistics and came out with several definitions. Some of them approached it as 'statistical data', i.e., numerical statement of facts. In this tradition, Horace Secrist said: 'Statistics may be defined as the aggregate of facts affected to a marked extent by multiplicity of causes, numerically expressed; enumerated or estimated according to a reasonable standard of accuracy, collected in a systematic manner, for a predetermined purpose and place in relation to each other.' In contrast, certain other experts defined it as 'statistical methods', i.e., complete body of the principles

Check Your Progress

3. Why is the knowledge obtained from science seldom conclusive?
4. For what purpose is social research conducted?
5. What are the two approaches to research?
6. How does research depend heavily on the past?

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and techniques used in collecting and analysing such data. In this genre, Croxton and Cowden writes: 'Statistics may be defined as the science of collection, presentation, analysis and interpretation of numerical data.'

In ancient times, the use of statistics was related to the state-craft or the administration of the affairs of the state. As a result of advancement in the field, statistics finds ready application in all physical as well as social sciences. Today, there is hardly any field that does not lend itself for application of statistical techniques and principles. It is applied, among others, in social sciences, planning, mathematics, economics, business, biology, astronomy, medical sciences, psychology and education. It extends beyond mere collection of data but involves scientific techniques to analyse it and draw sound inferences from it.

However, it has the following limitations:

- Statistics is not suited to the study of qualitative phenomenon but only to those things which are capable of quantitative measurement.
- Statistics does not study individuals but deals with an aggregate of objects and group characteristics.
- Statistical laws are not exact but are based on probability and its results are true only on an average.
- Statistics is liable to be misused as they can be moulded and manipulated in to suit one's arguments and reasoning. Incomplete data often leads to wrong and misleading conclusions.

Most disciplines undertake research. Research is more of a way of thinking than a set of skills. Research entails critically examining aspects of the study; making guiding principles for testing particular procedure; developing testing theories, etc.

For any study undertaken to be called a 'research', it should adhere to the following three criteria:

- A set of philosophies guide the research
- Methods, techniques and procedures which have proven reliability and validity are used
- Research has to be objective as well as unbiased

The philosophical orientation of research may stem from one of the two paradigms in research—*positivism* and *interpretivism*. Validity ensures that in a research study correct procedures have been applied to find answers to a question. Reliability refers to quality of a measurement procedure. Validity and reliability will be dealt with in detail in the following unit. 'Unbiased and objective' means that researchers take each step and draws each conclusion to the best of their ability without introducing their own biases and prejudices. (Ranjit Kumar, 1999).

1.4.1 Paradigms of Research: Positivism and Interpretivism

The application of scientific methods practised in natural sciences like physics and chemistry in researching various areas in social sciences is known as the *positivist approach*. Social scientists maintain absolute objectivity in the methods of study they follow and are concerned only with measurable phenomena. Quantitative approaches like experiments, surveys, etc., are concerned with positivism which stresses on generalizations and reliability. Social research basically wishes to establish scientific laws of society, or causal relationships that are arrived at by testing research hypothesis.

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In order to explain human behaviour, social researchers need to be conversant with people's interpretations of social phenomena. This approach is known as *interpretivism*. The methods used in natural sciences cannot be used without modifications in the social sciences. The perceptions, motivations and experiences of the social actors are explored by the research designs. Qualitative methods like interviews, observation studies, etc., that stresses on validity is mostly associated with interpretivism. The motives and intentions that underpin social behaviour are studied by social research.

1.4.2 Objectivity in Social Research

Social scientists are often influenced by their biases, passions, likes and dislikes, and preconceived notions. These are seen to interfere with the scientific objectivity that they would need while researching on social sciences. Objectivity is the capacity to represent truthfully and without prejudice, the results of one's research. A social researcher needs to be aware of his personal biases and prejudices and take adequate care that these do not affect the objectivity of the research. Max Weber, an exponent in social research argued, that actually, the thoughts and beliefs of the researchers *should* affect their topics of study. However, the social scientist needs to be value-neutral once the research question has been framed. Objectivity can be attained by sharing the results of research with experts who then may be asked to critically examine them. In his *The Logic of Scientific Discovery* (1959), Karl Popper maintained that *confirmation* and *refutation* are the essence of scientific discovery. Social researchers publish their work so that their work can be scrutinized by others. Journals have dedicated teams to decide whether the research material lives up to the standard of the journal and should, therefore, be published. Once a research material is published, other scholars look at it critically, especially when they do not agree with the findings. Some others may wish to replicate the study by changing the strategies and settings to check if the conclusion would remain the same.

Check Your Progress

7. List two limitations of the use of statistics in various fields.
8. What is the positivist approach to research?
9. Define objectivity.

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1.5 SUMMARY

In this unit, you have learnt that:

- Research in common parlance refers to search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation.
- Research in a technical sense is an academic activity. Clifford Woody defined research as an activity that comprises defining and redefining problems, formulating a hypothesis; collecting, organizing and evaluating data; making deductions and reaching conclusions; and carefully testing the conclusions to determine if they support the formulated hypothesis.
- The basic principles of research include a systematic process to identify a question or problem, set forth a plan of action to answer the question or resolve the problem, and meticulously collect and analyse data.
- The objective of any research is to find answers to questions through the application of scientific procedures. The main aim of any research is exploring the hidden or undiscovered truth.
- Science refers to organized knowledge, but this knowledge and these facts are seldom conclusive. New experiences and additional information constantly alter the previous findings and replace them with generalizations that confirm the latest bodies of findings.
- Research plays a very significant role in the field of social science. In order to study the importance and relationship between social science and research, social research is conducted or undertaken.

Check Your Progress

14. List two characteristics of hypothesis.
15. Why is a hypothesis tested?

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- Research that attempts to measure, describe, explain and predict the social and economic phenomena or social behaviour of human beings is known as 'social research'.
- Quantitative and qualitative are the two methods of research that are generally used by social scientists to conduct a research. In quantitative method, numerical data is collected and then analysed in order to measure the social phenomena. Qualitative method is basically the study of data, such as words, pictures and objects.
- Good research allows for research results to be verified by replicating the study, thereby building a sound basis for decisions.
- Almost all types of research primarily follow the two basic approaches depending on the need of quality and the amount of data available. These two approaches are:
(a) quantitative approach, and (b) qualitative approach.
- Qualitative approach is concerned with the subjective assessment of human attitude, opinions and behaviour. It generates results either in non-quantitative form or in non-numerical data.
- Experimental research involves conducting tests in a simulated or real space and time. The emphasis of most experimental research is on establishing cause and effect relationships, acquiring sensitivity of the dependent factor on an independent factor, keeping other independent factors under control and finding the conditions under which reactions take place.
- Ex-post facto research is similar to experimental research, which is conducted to deal with situations that occur in or around an organization. Studies that investigate possible cause and effect relationships by observing an existing condition or state of affairs and searching back in time for probable causal factors are collectively known as 'ex-post facto research'.
- Historical research turns to history or the past to study the patterns, their impact on the present, evolutionary process and so on. In a sense most of the researches are historical in nature because it uses data and information pertaining to the past. Hence, research depends heavily on the past.
- The subject matter of sociology is society. Sociologists study man's social behaviour in a variety of contexts. They use a number of methods in social research including 'comparative method', 'participant observer method', 'community studies', etc.
- The application of scientific methods practiced in natural sciences like physics and chemistry in researching various areas in social sciences is known as the *positivist approach*.
- In order to explain human behaviour, social researchers need to be conversant with people's interpretations of social phenomena. This approach is known as *interpretivism*.
- Objectivity is the capacity to represent truthfully and without prejudice, the results of one's research. A social researcher needs to be aware of his personal biases and prejudices and take adequate care that these do not affect the objectivity of the research.
- A survey entails administering a precisely worded questionnaire to a group of people in order to determine their characteristics, opinions and behaviours.

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- Fieldwork consists of many methods. The most common fieldwork is that of *participant observation*. The researcher becomes a part of the community under study; immerses himself/herself completely in the daily life of the community and participates in the activities of the members of the community but with a sense of detachment.
- Research process includes steps or a series of actions and logical sequence of those steps to carry out research effectively. The various steps in a research process are not mutually separate, exclusive or discrete, but they at the same time need not always follow each other.
- There are some common problems faced by researchers in developing countries and India is no exception. Basically, there is a dearth of the tools required for good research.
- A hypothesis is an approximate assumption that a researcher wants to test for its logical or empirical consequences. It can contain either a suggested explanation for a phenomenon or a proposal having deductive reasoning to suggest a possible interrelation between multiple phenomena.
- A hypothesis directs, monitors and controls the research efforts. It provides tentative explanations of facts and phenomena and can be tested and validated.
- Hypothesis is tested to identify the errors occurred in the statements and concepts used in hypothesis. Hypothesis testing can be broadly divided into two types, which are as follows:
 - o Parametric tests or standard tests of hypothesis
 - o Non-parametric tests or distribution-free tests of hypothesis

1.6 KEY TERMS

- **Research:** It is a careful investigation or enquiry, especially a thorough search for new facts in any branch of knowledge.
- **Social research:** Research that attempts to measure, describe, explain and predict the social and economic phenomena or social behaviour of human beings is known as 'social research'.
- **Ex-post facto:** It is a term used to define an action taken to change the effect given to a set of circumstances.
- **Positivist approach:** The application of scientific methods practiced in natural sciences like physics and chemistry in researching various areas in social sciences is known as the positivist approach.
- **Interpretivism:** In order to explain human behaviour, social researchers need to be conversant with people's interpretations of social phenomena. This approach is known as interpretivism.
- **Objectivity:** It is the capacity to represent truthfully and without prejudice, the results of one's research.
- **Hypothesis:** It is an approximate assumption that a researcher wants to test for its logical or empirical consequences.

1.7 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Research in common parlance refers to the search of knowledge.
2. The basic principles of research include a systematic process to identify a question or problem, set forth a plan of action to answer the question or resolve the problem, and meticulously collect and analyse data.
3. Science refers to organized knowledge, but this knowledge and these facts are seldom conclusive. New experiences and additional information constantly alter the previous findings and replace them with generalizations that confirm the latest bodies of findings.
4. Research plays a very significant role in the field of social science. In order to study the importance and relationship between social science and research, social research is conducted or undertaken.
5. Almost all types of research primarily follow the two basic approaches depending on the need of quality and the amount of data available. These two approaches are: (a) quantitative approach, and (b) qualitative approach.
6. Historical research turns to history or the past to study the patterns, their impact on the present, evolutionary process and so on. In a sense most of the researches are historical in nature because it uses data and information pertaining to the past. Hence, research depends heavily on the past.
7. The limitations of using statistics are:
 - Statistics is not suited to the study of qualitative phenomenon but only to those things which are capable of quantitative measurement.
 - Statistics does not study individuals but deals with an aggregate of objects and group characteristics.
8. The application of scientific methods practiced in natural sciences like physics and chemistry in researching various areas in social sciences is known as the *positivist approach*.
9. Objectivity is the capacity to represent truthfully and without prejudice, the results of one's research.
10. A survey entails administering a precisely worded questionnaire to a group of people in order to determine their characteristics, opinions and behaviours.
11. The most common fieldwork is that of participant observation.
12. The two types of sampling are: probability and non-probability sampling.
13. (i) interpretation
(ii) objective
(iii) repetition
14. The characteristics of hypothesis are:
 - **Simplicity:** A hypothesis should be stated in the most simple and clear terms to make it understandable.
 - **Consistency:** A hypothesis should be reliable and consistent with established and known facts.
15. Hypothesis is tested to identify the errors occurred in the statements and concepts used in hypothesis.

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UNIT 2 SCIENTIFIC AND SOCIAL RESEARCH -I

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Structure

- 2.0 Introduction
- 2.1 Unit Objectives
 - 2.2 Types of Social Research
 - 2.2.1 Survey
 - 2.2.2 Fieldwork
- 2.3 Major Steps in Social Research
 - 2.3.1 Flow Chart: Research Process
 - 2.3.2 Criteria of Good Research
 - 2.3.3 Problems Encountered by Researchers in India
- 2.4 Hypothesis
 - 2.4.1 Characteristics of Valid Hypothesis
 - 2.4.2 Need for Hypothesis Formulation
 - 2.4.3 Hypothesis Testing
- 2.5 Summary
- 2.6 Key Terms
- 2.7 Answers to 'Check Your Progress'
- 2.8 Questions and Exercises
- 2.9 Further Reading

2.0 INTRODUCTION

Simply defined, research is a search for knowledge. One can also define research as a scientific and systematic pursuit of information on a specific topic. Scientifically, research can also be termed as scientific investigation. Thus, research and scientific enquiry can be considered synonymous. The only difference between the two is that while it is possible to employ scientific method without research, it is not possible to conduct any research without employing scientific methods. Thus, research is a more specialized form of scientific enquiry which in turn is the result of gathering of data, information and facts for the specific purpose.

Social research pertains to research carried out by social scientists on various facets of society. Research plays a very significant role in the field of social science. In order to study the importance and relationship between social science and research,

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social research is conducted or undertaken. The research that attempts to measure, describe, explain and predict the social and economic phenomena or social behaviour of human beings is known as 'social research'. In this unit, you will get acquainted with the meaning, characteristics and objective of scientific research, aims and types of social research, steps in social research, and the concept of hypothesis.

2.1 UNIT OBJECTIVES

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

- Explain the meaning of the term research
- Discuss the concept of scientific research and the relationship between social science and research
- Analyse the aims of social research
- Assess the types of social research
- Describe the major steps involved in social research
- Assess the need for hypotheses formulation

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2.2 TYPES OF SOCIAL RESEARCH

Sociologists employ a variety of methods to learn about the social world. These methods are not mutually exclusive. Since each research method has strengths and weaknesses, a good research strategy may use several of them. Appelbaum and Chambliss (1997:40) hold that the principal methods of social research include survey and fieldwork.

2.2.1 Survey

A survey entails administering a precisely worded questionnaire to a group of people in order to determine their characteristics, opinions and behaviours. First, the researcher has to define a *population universe* to which the study applies: this is the group of people about whom generalization is to be made. Once the population universe is identified, a *sample*—a subset of cases selected to represent the larger population—must be selected, since it is seldom economically feasible or desirable to interview everyone in a chosen population universe.

Two principal type of sampling are used: *probability* and *non-probability sampling*. In the most common type of probability sampling, termed *random sampling*, everyone in the population universe has an equal chance of being in the sample. In *non-probability sampling*, subjects are deliberately chosen because of their specific characteristics. Once the sample is constructed or drawn, the questionnaire is

administered. Questionnaires may contain *open- or close-ended questions*. In *close-ended questions*, the respondents are required to choose only from predetermined alternative responses. In *open-ended questions*, there are no fixed responses to choose from. The respondents are provided with a wide range of opportunities to express a wide range of feelings and opinions.

One of the strengths of survey method is that it permits the researcher to draw conclusions about a large number of people on the basis of a much smaller number of interviews. This is a major advantage in terms of time and money. Surveys also have some weaknesses. Sometimes, surveys can be superficial since in order to be feasible economically, they usually call for brief responses to close-ended questions. Many-a-times, responses are self-serving, just intended to make the interviewee look good in the eyes of the researcher.

2.2.2 Fieldwork

Fieldwork consists of many methods. The most common fieldwork is that of *participant observation*. The researchers become a part of the community under study; immerses themselves completely in the daily life of the community and participates in the activities of the members of the community but with a sense of detachment. They then attempt to report all their findings on every aspect of their lives with a sense of impartiality and disinterestedness. Classical examples of fieldworks are William Whyte's (1915) *Street Corner Society* (1943), *A Study of Italian-American Working-Class Men* and B. Malinowski's *Study of the Tribes of Trobriand Island*.

Sometimes the research strategy requires that the researchers stay away from the people they are studying, simply observing what is going on. A sociologist studying crowd behaviour at a rally or student participation in a seminar would be an example. The researcher tries to be a 'fly on the wall', invisible and unobtrusive, yet constantly recording what is going on. This technique is called *detached observation*.

Interview is another method of fieldwork. It is a detailed conversation designed to obtain in-depth information about a person. In a *structured interview*, researchers have a detailed list of specific questions to ask. In the *semi-structured interview*, the researchers have a list of topics to cover depending on the interview situation, to determine the course of questioning and the details of the question.

Participatory research is another method under fieldwork. It is designed to involve the subjects of the research in the research process itself, with an eye to empowering them to overcome some difficulty or problem. This research is usually tied with community action. It is conducted when a group or community wants to engage in some form of social change but lacks the expertise to do so. The researcher is invited to become a fully engaged member of the social change process, helping the members of the group to conduct the necessary research and training them in the techniques for doing so.

Another method is *experiment*. In it, we choose two groups—the *experimental group* and the *control group*. An experimental group is one which is exposed to the independent variable. The control group is kept constant—no experiment is carried out on it. In the end, we compare both the groups to find out the resultant effects of the experiment.

Working with *available information* is another strategy. This involves working with data collected by other people. Often such data are the only information available. Examples include statistical data, documentary analysis or comparative-historical research

Check Your Progress

7. List two limitations of the use of statistics in various fields.
8. What is the positivist approach to research?
9. Define objectivity.

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(study of several different countries as well as examination of changing historical patterns in a single country).

APPROACH	WHEN APPROPRIATE
Survey	Basic information about a large population is required and sampling is a feasible strategy.
Interview	In-depth information is desired and direct access to informants is possible.
Detached observation	Information should be gathered but the data gathering should be as unobtrusive as possible.
Participant observation	First hand knowledge of the direct experience of subjects is required.
Participatory research	Primary goal is empowerment: training people to acquire the necessary skill to do research themselves.
Experiments	To determine specific causal relationships.
Using the available information	Direct acquisition of data is either not feasible or not desirable.

2.3 MAJOR STEPS IN SOCIAL RESEARCH

Research process includes steps or a series of actions and logical sequence of those steps to carry out research effectively. The various steps in a research process are not mutually separate, exclusive or discrete, but they at the same time need not always follow each other. The researcher, at each step, anticipates subsequent steps and requirements. The tentative order of the steps and the procedural guidelines of the research process are as given below:

- (i) **Formulating the research problem:** At the very beginning of research, the researcher must clearly define the research problem, i.e., the area of interest, the matter to be inquired into, etc. The problem, before being solved, is initially stated in a broader perspective and then the researcher arrives at the specific question by gradually reducing the ambiguities, if any. Then, immediately after formulating the problem, the feasibility of different solutions is studied before choosing the right solution.
- (ii) **Extensive literature survey:** After formulating the research problem, a brief summary of it should be prepared—this is an essential step. While writing a Ph.D. thesis a researcher has to prepare a synopsis of the topic and submit it to the appropriate committee or research board for approval. Synopsis preparation needs extensive survey of the literature connected with the problem.
- (iii) **Development of a working hypothesis:** After surveying the literature, the researcher should clearly state the working hypothesis, which is a tentative assumption made before testing it in logical or empirical sequences. Hypothesis must be as specific as possible and should be limited to the intended research. This helps to choose the right process.
- (iv) **Preparing the research design:** The next step, after clearly defining the research problem, is preparing the suitable research design. The research design includes the conceptual framework within which research would be carried out. A good and planned research design helps to carry out the study in an efficient manner

Check Your Progress

- 10. What does a survey entail?
- 11. Name the most common fieldwork.
- 12. What are the two types of sampling?

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saving time and resources. It helps to gather the most useful information and assists in arriving at the accurate results. Simply put, a good research design facilitates the collection of relevant evidence with minimal expenditure of money, effort, time and other resources.

- (v) **Determining sample design:** A universe or population includes all the items under inquiry. If all the items in the population are inquired then such an inquiry is called census inquiry. In a census survey, all the items are covered and so the highest accuracy is obtained. But this may not be practicable in surveys involving a big population. Census surveys need huge amounts of time, money and energy. Hence, quite often it is wise to select only a few items from the universe for study purposes. Technically, such a small and convenient number of items selected, is called a **sample**. Specified plan of the size and method of collecting the sample is technically known as **sample design**.
- (vi) **Collecting the data:** In most cases, the data in hand is insufficient and there is always a need of fresh data. There are different ways of collecting the appropriate data which differ considerably in terms of relevance, expenditure, time and other resources. Therefore, the researcher must select the most appropriate method of collecting the data after considering the objective of the research, the nature of investigation, time and financial resources available, scope of the inquiry, and the desired degree of accuracy.
- (vii) **Execution of the project:** This is an important step in the research process because if the execution proceeds on the correct lines, the collected data would be dependable, adequate and accurate. Therefore, systematic and timely execution of a project plays a crucial role in ensuring the right results at the end.
- (viii) **Analysis of data:** After collecting the data, the next step is analysing the data. The data analysis includes a number of closely-related operations like specifying different categories of data, differentiating and tabulating the data into different categories, applying the statistical techniques and formulae to the data, doing the right calculations and then drawing statistical inferences. Various tests, such as chi-square test, *t*-test, *F*-test, etc., help in data analysis.
- (ix) **Hypothesis-testing:** After analysing the data, the researcher should test the working hypothesis against the statistical inferences obtained after analysing the data. The question that should be answered now is: Do the findings support the working hypothesis or do they contradict?
- (x) **Generalizations and interpretation:** If a hypothesis is tested and upheld sufficient number of times, the researcher can arrive at a generalization. The degree of success of a research is calculated on the basis of how much the arrived generalizations are close to the acceptability. If the researcher starts with no hypothesis, the researcher will interpret his findings on the basis of some existing theory and this is known as **interpretation**. The process of interpretation often triggers new questions which lead to further researches.
- (xi) **Preparation of the report or the thesis:** Finally, the researcher has to prepare the report of what has been studied. Report must be written with great care keeping the following layout in mind:
 - **Preliminary pages:** These pages of the report should contain the title, the date, acknowledgments, foreword, table of contents, list of tables, list of graphs and charts (if any).

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- **Main text:** The main text of the report should have introduction, summary of findings, main report, conclusion and suggestions for future research.
- **Closure:** At the end of the report, appendices should be listed in respect of all technical data, followed by bibliography. Index terms should also be given specially in a published research report. All references should be cited as per the research writing formats.

2.2.3 Flow Chart: Research Process

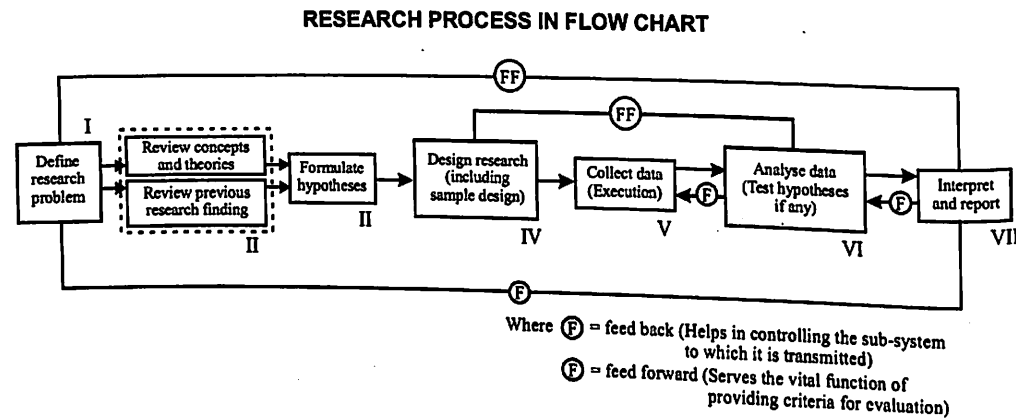


Fig. 1.1 Research Process

In Figure 1.1, the flow chart indicates the sequential steps to be followed in the research process. One must start with defining the research problem along with reviewing the relevant literature in the field to become familiar with the concepts and theories relevant to the issue to be investigated. The next step is the formulation of the hypothesis, data and its analysis is to be attempted. After that the interpretation and the report writing stages complete the research report. These have to be written step by step and then edited and refined several times before preparing the final report.

2.2.4 Criteria of Good Research

Whatever be the type of research one undertakes, certain common criteria of good scientific methods have to be followed. A good research follows logical methods, is systematic, and structured in accordance with well-defined sets of rules and practices to enable the researcher in arriving at dependable conclusions. Both, deductive reasoning and inductive reasoning, should be followed for meaningful research.

Good research also implies obtaining reliable data which provides sound validity to the research findings.

The following principles underlie a good research criteria:

- The aim and objective of the research being conducted should be clearly specified.
- The research procedure should be replicable so that if the research needs to be continued or repeated, it can be done easily.
- The research design should be so chosen that the results are as objective as possible.
- Interpretation of any research should be done keeping in mind the flaws in the procedural design and the extent to which it has an effect on the results.

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- Research should be carried out systematically. It should progress in pre-defined stages, and researchers should avoid using their intuition or guesswork to arrive at conclusions.
- Research should be logical so that it is meaningful, and help in decision-making.
- Research should be empirical as far as possible.
- The results of the research should only be used and generalized for the population for which the data provides an adequate basis.
- The validity and reliability of the data used in research should be double checked.
- Further, good research produces results that are examinable by peers, methodologies that can be replicated, and knowledge that can be applied to real-world situations.

2.2.5 Problems Encountered by Researchers in India

There are some common problems faced by researchers in developing countries and India is no exception. Basically, there is a dearth of tools required for good research. Many of the universities and research institutions are now providing computers with Internet connection to researchers but the facilities provided are not adequate. Luckily, the costs of both hardware and Internet bandwidth have reduced over a period of time. While Indian researchers now have easy access to these tools, there is still the problem of low visibility of papers published by them. Indian researchers are often demotivated to continue further research. Other factors like lack of scientific training in the methodology of research and a non-existent code of conduct also serve as challenges for the Indian researcher. There is also insufficient interaction between researchers and the end-users. End-users of research are the ones who stand to benefit from research and if they are not made aware of the benefit they can derive, getting sponsors to provide funds for research would be difficult.

There is also a lack of safeguards against any violation of confidentiality in data collection. Research studies that overlap lead to unnecessary repetition. There is an absence of research culture in our country.

Other problems that Indian researchers face that are common to developing countries are:

- Limited or no access to international research journals
- Lack of infrastructure except in a few metropolitan cities
- Low investment in research due to financial constraints
- Inadequate library facilities and where such facilities exist, they are not easily accessible
- Poor encouragement to do research

These problems need to be surmounted effectively in order to promote research as a professional activity.

2.3 HYPOTHESIS

A hypothesis is an approximate assumption that a researcher wants to test for its logical or empirical consequences. It can contain either a suggested explanation for a phenomenon

Check Your Progress

13. Fill in the blanks with appropriate words.
- The process of _____ often triggers new questions which lead to further researches.
 - The research design should be so chosen that the results are as _____ as possible.
 - Research studies that overlap lead to unnecessary _____.

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or a proposal having deductive reasoning to suggest a possible interrelation between multiple phenomena. A deductive reasoning can be defined as a type of reasoning that can be derived from previously known facts.

Some definitions of hypothesis are:

- According to Townsend, 'Hypothesis is defined as suggested answer to a problem.'
- According to McGuigan, 'A hypothesis is a testable statement of a potential relationship between two or more variables.'
- According to Uma Sekaran, 'A hypothesis is defined as a logically conjectured relationship between two or more variables in the form of testable statement. These relationships are based on theoretical framework formulated for the research problem. The hypotheses are often statements about population parameters like expected value and variance, for example a hypothesis might be that the expected value of the height of 10-year-old boys in the Scottish population is not different from that of 10-year-old girls.'
- According to Kerlinger, 'A good hypothesis is one which satisfies the following criteria:
 - (i) Hypothesis should state the relationship between variables.
 - (ii) They must carry clear implications for testing the stated relations.'

This means that: (a) statements contain two or more variables which can be measured, (b) they must state clearly how the two or more variables are related, and (c) it is important to note that facts and variables are not tested but relations between variables exist.

2.3.1 Characteristics of Valid Hypothesis

There are several characteristics of hypothesis, which are as follows:

- **Conceptually clear and accurate:** The hypothesis must be conceptually clear. The concepts and variables should be clearly defined operationally. The definition should use terms which are commonly accepted and it should ensure that communication is not hindered. Hypothesis should be clear and accurate so as to draw a consistent conclusion.
- **Statement of relationship between variables:** If a hypothesis is relational, it should state the relationship between the different variables.
- **Testability:** A hypothesis should have empirical referents which means that it should be testable through the empirical data. Hypothesis involving mystical or supernatural arenas are impossible to test. For example, the hypothesis 'education brings all-round development' is difficult to test because it is not easy to operationally isolate the other factors that might contribute towards all-round development. Since a hypothesis predicts the outcome of a study and it must relate variables that are capable of being measured. The hypothesis such as 'there is a positive relationship between the learning style and academic achievement of 8th grade students' can be tested since the variables in the hypothesis are operationally defined, and therefore can be measured.

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- **Specific with limited scope:** A hypothesis, which is specific with limited scope, is easily testable than a hypothesis with limitless scope. Therefore, a researcher should give more time to conduct research on such a kind of hypothesis.
- **Simplicity:** A hypothesis should be stated in simple and clear terms to make it understandable.
- **Consistency:** A hypothesis should be reliable and consistent with established and known facts.
- **Time limit:** A hypothesis should be capable of being tested within a reasonable amount of time. In other words, the excellence of a hypothesis is judged by the time taken to collect the data needed for the test.
- **Empirical reference:** A hypothesis should explain or support all the sufficient facts needed to understand what the problem is all about.

A few more characteristics of a good hypothesis are as follows:

- It ensures that the sample is readily approachable.
- It maintains a very apparent distinction with what is called theory, law, facts, assumptions and postulates.
- It should have logical simplicity, large number of consequences and be expressed in quantified form.
- It should have equal chances of confirmation and rejection.
- It permits the application of deduction reasoning.
- Tools and data should be easily available and effectively used.
- It should be based on the study of previous literature and an existing theory, and should be verifiable.

As soon as a research question is formulated, it makes the hypothesis formulation imperative since a *hypothesis* is a tentative solution or an intelligent guess about a research question under study. It is an assumption or proposition whose tenability is to be tested on the basis of its implications with empirical evidence and previous knowledge. Modern investigators agree that, whenever possible, research should proceed from a hypothesis. In the words of Van Dalen (1973), 'a hypothesis serves as a powerful beacon that lights the way for the research worker'.

2.3.2 Need for Hypothesis Formulation

The reasons for formulating a hypothesis are as follows:

- A hypothesis directs, monitors and controls the research efforts. It provides tentative explanations of facts and phenomena and can be tested and validated. Such explanations, if held valid, lead to generalizations, which help significantly in understanding a problem. They, thereby, extend the existing knowledge in the area to which they pertain and thus help in theory building and facilitate the extension of knowledge in an area.
- The hypothesis not only indicates what to look for in an investigation but also how to select a sample, choose the design of research, how to collect data and how to interpret the results to draw valid conclusions.
- The hypothesis orients the researcher to be more sensitive to certain relevant aspects of the problem so as to focus on specific issues and pertinent facts. It

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helps researchers to delimit their study in scope so that it does not become broad and unwieldy.

- The hypothesis provides rational statements to the researcher, consisting of elements expressed in a logical order of relationships, which seek to describe or explain conditions or events that have not been confirmed by facts. Some relationships between elements or variables in a hypotheses are known facts, and others transcend the known facts to give reasonable explanations for known conditions. Hypothesis help researchers to relate logically known facts to intelligent guesses about unknown conditions (Ary, *et al.*, 1972, pp. 73-74).
- Hypothesis formulation and its testing add a scientific rigour to all types of researches. A well thought set of hypothesis places a clear and specific goal before the researcher and equips him/her with understanding. It provides the basis for reporting the conclusions of the study on the basis of these conclusions. Researchers can make their research report interesting and meaningful to the reader. The importance of a hypothesis is generally recognized more in the studies which aim to make predictions about some outcome. In an experimental study, the researcher is interested in making predictions about the expected outcomes and hence the hypothesis takes on a critical role. In the case of historical or descriptive studies, however, the researcher investigates the history of an event, or the life of a man, or seeks facts in order to determine the *status quo* of a situation and hence may not have a basis for making a prediction of the results. In studies of this nature, where finding facts is the objective of the study, a hypothesis may not be required.

Most historical or descriptive studies involve fact finding as well as the interpretation of facts in order to draw generalizations. For all such major studies, a hypothesis is recommended so as to explain observed facts, conditions or behaviour and to serve as a guide in the research process. If a hypothesis is not formulated, researchers may waste time and energy in gathering extensive empirical data, and then find that they cannot state facts clearly and detect relevant relationships between variables as there is no hypothesis to guide them.

2.3.3 Hypothesis Testing

Hypothesis testing is carried out to determine whether or not the hypothesis is appropriate. This involves either accepting or rejecting a null hypothesis. The researcher has to pursue certain activities contained in the procedure of hypothesis.

In the formulation of a hypothesis, the investigator looks for those statements where he/she relates one or more variables to make predictions about the relationships. The hypothesis guides the researcher what to do and why to do it in the context of the problem.

For example, if a researcher is interested to study the problem, 'Why does a gifted child become a poor achiever in school?' The researcher then moves towards finding out the causes and factors that have been responsible for the child's poor achievement. The researcher makes a conjecture that the child might be suffering from some disease at the time of examination. Conjecture is in the form of a hypothesis, and this now determines what the researcher should do to verify whether it is a fact or not. The researcher will then go to the student's home, meet his/her parents and enquire about the student's health. All that the investigator is doing is guided by the hypothesis he/she had developed.

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Thus, a hypothesis refers to a conjecture statement about the solution to a problem, which researchers verify on the basis of the relevant information collected by them. It is said to be a hunch, shrewd guess or supposition about what the answer to a problem may be. It is a statement which is tested in terms of the relationship or prediction, etc., which after testing is either accepted or rejected.

A hypothesis relates theory to observation and vice-versa. Hypotheses when tested are either rejected or accepted, and help to infer the conclusion, which helps in theory building. Being a specific statement of prediction, a hypothesis describes in concrete (rather than theoretical) terms what you expect will happen in your study. Not all studies have hypotheses. Sometimes a study is designed to be exploratory. In such researches, no formal hypothesis is established, and it may happen that the actual objective of the study is to explore one or more specific areas more thoroughly in order to develop specific hypotheses or predictions that could be tested through research in the future. A single study could result in one or several hypotheses.

Sources of Hypothesis

Since the mind is fed by innumerable streams and sources, it is difficult to pinpoint how a particular good idea comes to a researcher. The following are some of the popularly known sources of research hypothesis:

- **Scientific theories:** A systematic review and analysis of theories developed in the field of psychology, sociology, economics, political science and biological science may provide the researcher with potential clues for constructing a good and testable hypothesis.
- **Expert opinions:** Discussion with the experts in the field of research may further help the researcher obtain necessary insight and skill into the problem and in the formulation of a hypothesis.
- **Method of related difference:** When we find that two phenomena differ constantly and the other circumstances remain the same, we suspect a causal connection. For example, when we find uncontrolled traffic in a locality, resulting in a greater number of road accidents, we suspect a causal connection between uncontrolled traffic and road accidents. This method also suggest hypothesis.
- **Intellectual equipment of researcher:** Intellectual abilities of a researcher like creative thinking and problem solving techniques are very helpful in the formulation of a good hypothesis.
- **Related literature:** Related literature is the most important source of hypothesis formulation. A review of this literature may reveal to the researcher the variables that have been considered important in relation to his/her problem, which aspects have already been studied and which are left to be studied, which theories have supported the relationships and which theories present a contradictory relationship. Familiarity with related literature may give the researcher a tremendous advantage in the construction of hypothesis.
- **Experience:** One's own experience may be a rich source of hypothesis generation. Personal experiences of an individual which has been gained through reading biographies, autobiographies, newspaper readings or through informal talks among friends, etc., can be a potential source of generation of a hypothesis. For example, a researcher who is working on the effectiveness of guidance in teaching, can think of factors such as the teacher's polite behaviour, techniques

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of counselling, mastery over the subject, effective use of teaching skills, decision-making capability, perception of his/her competence, perception of student's capacity for better interaction, use of communication skills, etc.

- **Analogies:** Several hypotheses in a branch of knowledge may be made by using analogies from other sciences. Models and theories developed in a discipline may help, through extrapolation, in the formulation of hypothesis in another discipline. By comparing the two situations, analysing their similarities and differences, some rationale may emerge in the mind of the researcher which may take the form of a hypothesis for testing. For example, in a research problem like studying the factors of unrest among college level students, the researcher insightfully thinks: 'Why was unrest found among school students?' and 'What has changed them: quality of teaching or quality of leadership?'
- Arguing analogically in this way may lead the investigator to some conclusions which may be used for identifying variables and relationships, which form the basis of hypothesis construction. If a researcher knows from previous experience that the old situation is related to other factors Y and Z as well as to X, he/she may reason out that the new situation may also be related to Y and Z.
- **Methods of residues:** When the greater part of a complex phenomenon is explained by some causes already known, we try to explain the residual part of phenomenon according to the known law of operation. It also provides possible hypothesis.
- **Induction by simple enumeration:** Sometimes scientists take common experience as a starting point of their investigation. For example, after observing a large number of scarlet flowers that are devoid of fragrance, we frame a hypothesis that all scarlet flowers are devoid of fragrance. Thus, induction by simple enumeration is a source of discovery.
- **Formulation of hypothesis:** It may also originate from the need and practice of present times.
- **Existing empirical uniformities:** In terms of common sense proposition, the existing empirical uniformities may form the basis for scientific examination.
- **A study of general culture:** It is also a good source of hypothesis.
- **Suggestions:** When given by other researchers in their reports, suggestions are quite helpful in the establishment of hypothesis for future studies.

Procedure of Hypothesis Testing

The procedure for hypothesis testing are as follows:

- **Making formal statement:** In this step, the nature of a hypothesis is clearly stated, which could be either a null hypothesis or an alternative hypothesis. Stating a problem in hypothesis testing is of utmost importance, which should be done with proper care, keeping in mind the object and nature of the problem.
- **Choosing a significance level:** In this step a hypothesis is tested on the basis of a present significance level, which has to be adequate in terms of nature and purpose of the problem.
- **Sampling distribution:** In this step, determination of an appropriate sampling distribution and making a choice between normal distribution and *t*-distribution is included.

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- **Selection of a sample randomly:** In this step, a random sample is selected from the sample data for determining an apt value.
- **Probability calculation:** In this step, the probability regarding viability of the sample result is made dependent on the null hypothesis.
- **Comparison:** In this step, the calculated probability and the value of alpha in case of one-tailed test and alpha in case of two-tailed test is compared.

Types of Hypothesis Testing

Hypothesis is tested to identify the errors occurred in the statements and concepts used in hypothesis. Hypothesis testing can be broadly divided into two types, which are as follows:

- Parametric tests or standard tests of hypothesis
- Non-parametric tests or distribution-free tests of hypothesis

1. Parametric Tests or Standard Tests of Hypothesis

These kinds of tests assume certain properties of the population sample such as observations from a normal population, large sample size, population parameters like mean and variance. The various parametric tests of hypothesis are based on the assumption of normality. In other words, the source of data for them is normally distributed. They can be listed as follows:

- **Z-Test:** This kind of test is based on normal probability distribution. It is mostly used to judge the significance of mean as a statistical measure. This is the most frequently used test in research studies. It is generally used to compare the mean of a sample with the hypothesized mean of the population. It is also used in case the population variance is known. It is helpful in judging the significance of difference between the means of two independent large samples, to compare the sample proportion to a theoretical value of population proportion and to judge the significance of median, mode and coefficient of correlation.
- **T-test:** This test is based on *t*-distribution and is aptly considered to judge the significance of a sample mean or the difference between the means of two small samples when population variance is not known.
- **χ^2 :** This test is based on a chi-square distribution and is used for comparing a sample variance to a theoretical population variance.
- **F-test:** This test is based on F-distribution and is also used to compare the variance of two independent samples. It is also used to compare the significance of multiple correlation coefficients.

2. Non-parametric Tests or Distribution-free Tests of Hypothesis

There are situations where assumptions cannot be made. In such situations, different statistical methods are used which are known as 'non-parametric tests'. There are various types of non-parametric tests. The important non-parametric tests are as follows:

- **Sign test:** This is one of the easiest tests in practice based on the plus/minus sign of an observation in a sample. The sign may be one of the following two types:
 - **One-sample sign test:** This is a very simple distribution-free test and is applied in case of a sample from a continuous symmetrical population, wherein the probability of a sample to be either less or more than the mean is half.

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Here, to test a null hypothesis, all those items which are greater than the alternate hypothesis are replaced by a plus sign and those which are less than the alternate hypothesis are replaced by a minus sign.

- o **Two-sample sign test:** In case of all the problems consisting of paired data, two-sample sign test is used. Here, each pair of values can be replaced with a plus sign in the first value of the first sample with the first value of the second sample. If the first value is less, minus sign is assigned.
- **Fisher-Irwin test:** This is applied when there is no difference between two sets of data. In other words, it is used where you can assume that two different treatments are supposedly different in terms of the results that they produce. It is applied in all those cases where result for each item in a sample can be divided into one of the two mutually exclusive categories.
- **McNamara test:** It is applied where the data is nominal in nature, and is related to two interrelated samples. By using this test, you can judge the significance of any observed changes in the same subject.
- **Wilcoxon matched-pairs test:** This test is applied in the case of a matched-pair such as the output of two similar machines. Here, you can determine both the direction and the magnitude between the matched values. This test is also called Signed Rank Test.

2.4 SUMMARY

In this unit, you have learnt that:

- Research in common parlance refers to search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation.
- Research in a technical sense is an academic activity. Clifford Woody defined research as an activity that comprises defining and redefining problems, formulating a hypothesis; collecting, organizing and evaluating data; making deductions and reaching conclusions; and carefully testing the conclusions to determine if they support the formulated hypothesis.
- The basic principles of research include a systematic process to identify a question or problem, set forth a plan of action to answer the question or resolve the problem, and meticulously collect and analyse data.
- The objective of any research is to find answers to questions through the application of scientific procedures. The main aim of any research is exploring the hidden or undiscovered truth.
- Science refers to organized knowledge, but this knowledge and these facts are seldom conclusive. New experiences and additional information constantly alter the previous findings and replace them with generalizations that confirm the latest bodies of findings.
- Research plays a very significant role in the field of social science. In order to study the importance and relationship between social science and research, social research is conducted or undertaken.

Check Your Progress

14. List two characteristics of hypothesis.
15. Why is a hypothesis tested?

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- Research that attempts to measure, describe, explain and predict the social and economic phenomena or social behaviour of human beings is known as 'social research'.
- Quantitative and qualitative are the two methods of research that are generally used by social scientists to conduct a research. In quantitative method, numerical data is collected and then analysed in order to measure the social phenomena. Qualitative method is basically the study of data, such as words, pictures and objects.
- Good research allows for research results to be verified by replicating the study, thereby building a sound basis for decisions.
- Almost all types of research primarily follow the two basic approaches depending on the need of quality and the amount of data available. These two approaches are:
 - (a) quantitative approach, and (b) qualitative approach.
- Qualitative approach is concerned with the subjective assessment of human attitude, opinions and behaviour. It generates results either in non-quantitative form or in non-numerical data.
- Experimental research involves conducting tests in a simulated or real space and time. The emphasis of most experimental research is on establishing cause and effect relationships, acquiring sensitivity of the dependent factor on an independent factor, keeping other independent factors under control and finding the conditions under which reactions take place.
- Ex-post facto research is similar to experimental research, which is conducted to deal with situations that occur in or around an organization. Studies that investigate possible cause and effect relationships by observing an existing condition or state of affairs and searching back in time for probable causal factors are collectively known as 'ex-post facto research'.
- Historical research turns to history or the past to study the patterns, their impact on the present, evolutionary process and so on. In a sense most of the researches are historical in nature because it uses data and information pertaining to the past. Hence, research depends heavily on the past.
- The subject matter of sociology is society. Sociologists study man's social behaviour in a variety of contexts. They use a number of methods in social research including 'comparative method', 'participant observer method', 'community studies', etc.
- The application of scientific methods practiced in natural sciences like physics and chemistry in researching various areas in social sciences is known as the *positivist approach*.
- In order to explain human behaviour, social researchers need to be conversant with people's interpretations of social phenomena. This approach is known as *interpretivism*.
- Objectivity is the capacity to represent truthfully and without prejudice, the results of one's research. A social researcher needs to be aware of his personal biases and prejudices and take adequate care that these do not affect the objectivity of the research.
- A survey entails administering a precisely worded questionnaire to a group of people in order to determine their characteristics, opinions and behaviours.

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- Fieldwork consists of many methods. The most common fieldwork is that of *participant observation*. The researcher becomes a part of the community under study; immerses himself/herself completely in the daily life of the community and participates in the activities of the members of the community but with a sense of detachment.
- Research process includes steps or a series of actions and logical sequence of those steps to carry out research effectively. The various steps in a research process are not mutually separate, exclusive or discrete, but they at the same time need not always follow each other.
- There are some common problems faced by researchers in developing countries and India is no exception. Basically, there is a dearth of the tools required for good research.
- A hypothesis is an approximate assumption that a researcher wants to test for its logical or empirical consequences. It can contain either a suggested explanation for a phenomenon or a proposal having deductive reasoning to suggest a possible interrelation between multiple phenomena.
- A hypothesis directs, monitors and controls the research efforts. It provides tentative explanations of facts and phenomena and can be tested and validated.
- Hypothesis is tested to identify the errors occurred in the statements and concepts used in hypothesis. Hypothesis testing can be broadly divided into two types, which are as follows:
 - o Parametric tests or standard tests of hypothesis
 - o Non-parametric tests or distribution-free tests of hypothesis

2.5 KEY TERMS

- **Research:** It is a careful investigation or enquiry, especially a thorough search for new facts in any branch of knowledge.
- **Social research:** Research that attempts to measure, describe, explain and predict the social and economic phenomena or social behaviour of human beings is known as 'social research'.
- **Ex-post facto:** It is a term used to define an action taken to change the effect given to a set of circumstances.
- **Positivist approach:** The application of scientific methods practiced in natural sciences like physics and chemistry in researching various areas in social sciences is known as the positivist approach.
- **Interpretivism:** In order to explain human behaviour, social researchers need to be conversant with people's interpretations of social phenomena. This approach is known as interpretivism.
- **Objectivity:** It is the capacity to represent truthfully and without prejudice, the results of one's research.
- **Hypothesis:** It is an approximate assumption that a researcher wants to test for its logical or empirical consequences.

2.6 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Research in common parlance refers to the search of knowledge.
2. The basic principles of research include a systematic process to identify a question or problem, set forth a plan of action to answer the question or resolve the problem, and meticulously collect and analyse data.
3. Science refers to organized knowledge, but this knowledge and these facts are seldom conclusive. New experiences and additional information constantly alter the previous findings and replace them with generalizations that confirm the latest bodies of findings.
4. Research plays a very significant role in the field of social science. In order to study the importance and relationship between social science and research, social research is conducted or undertaken.
5. Almost all types of research primarily follow the two basic approaches depending on the need of quality and the amount of data available. These two approaches are: (a) quantitative approach, and (b) qualitative approach.
6. Historical research turns to history or the past to study the patterns, their impact on the present, evolutionary process and so on. In a sense most of the researches are historical in nature because it uses data and information pertaining to the past. Hence, research depends heavily on the past.
7. The limitations of using statistics are:
 - Statistics is not suited to the study of qualitative phenomenon but only to those things which are capable of quantitative measurement.
 - Statistics does not study individuals but deals with an aggregate of objects and group characteristics.
8. The application of scientific methods practiced in natural sciences like physics and chemistry in researching various areas in social sciences is known as the *positivist approach*.
9. Objectivity is the capacity to represent truthfully and without prejudice, the results of one's research.
10. A survey entails administering a precisely worded questionnaire to a group of people in order to determine their characteristics, opinions and behaviours.
11. The most common fieldwork is that of participant observation.
12. The two types of sampling are: probability and non-probability sampling.
13. (i) interpretation
(ii) objective
(iii) repetition
14. The characteristics of hypothesis are:
 - **Simplicity:** A hypothesis should be stated in the most simple and clear terms to make it understandable.
 - **Consistency:** A hypothesis should be reliable and consistent with established and known facts.
15. Hypothesis is tested to identify the errors occurred in the statements and concepts used in hypothesis.

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2.7 QUESTIONS AND EXERCISES

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Short-Answer Questions

1. Give Clifford Woody's definition of research.
2. What are the objectives of scientific research?
3. Enumerate the steps in scientific process.
4. What is social research?
5. What are the qualities of good research?
6. How can the qualitative approach to research be classified?
7. What is the similarity between experimental research and ex-post facto research?
8. List the nature and scope of a good and effective research.
9. Describe the positivist and interpretivist approach to research.
10. What is a fieldwork? Describe the various methods of fieldwork.
11. State the problems faced by researchers in India.
12. What is a hypothesis? What are its sources?
13. What are the types of hypothesis testing?

Long-Answer Questions

1. Explain the meaning of the term research.
2. Discuss the concept of scientific research and the relationship between social science and research.
3. Evaluate the characteristics of good research.
4. Critically analyse the aims of social research.
5. 'Appelbaum and Chambliss (1997:40) hold that the principal methods of social research include survey and fieldwork.' With regard to this statement, assess the two types of social research.
6. Describe the major steps involved in social research.
7. What is a hypothesis? Assess the need for hypotheses formulation.

2.8 FURTHER READING

- Chawla, D. and N. Sondhi. 2011. *Research Methodology*. New Delhi: Vikas Publishing House.
- Kothari, C. R. 2008. *Research Methodology*. New Delhi: New Age International Publishers.
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UNIT 3 : CONCEPT, THEORY AND FACT -I

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Structure

- 3.0 Introduction
- 3.1 Unit Objectives
- 3.2 Concept, Theory and Fact: An Overview
 - 3.2.1 Theory and Facts
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- 3.4 Key Terms
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- 3.6 Questions and Exercises
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3.0 INTRODUCTION

The previous unit dealt with the meaning, characteristics and objectives of scientific research; aims and types of social research; major steps in social research and the concept of hypothesis. In this unit, you will learn about the meaning of the terms concept, fact and theory; inductive and deductive reasoning; theory building; objectivity-subjectivity debate; and validity and reliability.

The basic elements that define scientific methods are known as concepts, yet all concepts are by and large only abstractions. Facts are logical constructions of concepts. A close relationship exists between a theory and fact where a theory is only a speculation and it has to be proved before it can be called a theory definitively. When a theory is proved, it becomes a fact.

There are various methods of scientific enquiry. The two most important ones are—deductive and inductive reasoning. Deductive reasoning is one where the researcher moves from the general to the specific part of the research. Inductive reasoning is also called the bottom-up approach. It tends to move from particular observations to wide generalizations.

There is an ongoing debate on the subject of objectivity or subjectivity of research carried out by researchers where the researchers are supposed to be unbiased and objective rather than subjective. Herein, value neutrality is the duty of sociologists to strive to be impartial and overcome their biases as they conduct their research.

Every good measuring tool must be subjected to the tests of validity, reliability and practicality. Validity means that the test must measure what it purports to measure. Reliability implies the consistency with which a test measures what it seeks to measure.

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3.1 UNIT OBJECTIVES

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

- Discuss the term concept in detail
- Evaluate the relationship between concept, fact and theory
- Discuss the function of theory building
- Assess the differences between inductive and deductive reasoning
- Analyse the debate on objectivity and subjectivity in the field of research
- Explain the concepts of validity and reliability with regard to research

3.2 CONCEPT, THEORY AND FACT: AN OVERVIEW

The basic elements that define scientific methods are known as concepts, yet all concepts are by and large only abstractions. That is to say, concepts are representative of only a part of reality. Yet, concepts should be communicative. There are many definitions of concept but there is no one clear cut definition.

There is a close relationship between concept and phenomena. A discipline may be a pure or applied science, yet each will have its terms or concepts to communicate its objectives and findings. Thus, concepts help towards the comprehension of a phenomena or such aspects which we try to understand as researchers. Concepts thus symbolize a phenomena. At times, concept and phenomena are taken together but that is not the case in reality. Students should remember that concepts are only abstractions and are not representative of the whole reality, but part of it. Therefore, it is important to know as to which concepts are required to be understood in order to further develop concepts. In cases where concepts are confused with phenomena, it can lead to error. The failure to separate concept from phenomena is called 'fallacy of ramification', i.e. believing abstractions are but phenomena in real.

Further, there are differences between concepts and facts. Concepts are symbolic of the empirical relationships whereas phenomena are in turn represented by facts. Facts thus become logical constructions of concepts and hence concepts not only define the basic scientific method but also are key to most human thoughts and communications.

This brings us to the definition of concept. Fred N. Kerlinger is of the view that, 'A concept expresses an abstraction formed by generalization from particulars.' For instance, energy, force, weight, are all concepts. Then there are concepts of achievement, failure, I.Q., which are used to understand the human nature. P. V. Young has written,

Each new class of data, isolated from the other classes on the basis of definite characteristics, is given a name, a label—in short a concept. A concept is in reality a definition in shorthand of a class or a group of facts. Truancy, attitude, aggression, frustration, anxiety, are all illustrations of concepts into which are condensed a number of events or phenomena under one general heading.

But no concept can be easily and precisely defined. Even concepts are complex and varied, especially those concerned with human nature which are abstract and cannot be concretely defined.

There are several reasons why concepts lack clarity. One of these is due to the fact that concepts develop from shared experiences and they may be shared differently

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in numerous languages and words. For example, people of different regions grow up in a different geographical location, have different tastes and work under diverse circumstances and thus they develop their own concepts out of their experiences. Hence, a precise definition of concept becomes difficult.

Concepts also develop in dissimilar frameworks since a concept is developed with certain objectives and is used only towards addressing that particular objective. With time, that concept may be used in different studies and frameworks, thereby making its exact definition difficult. For instance, the concept of mass has different conceptual understanding in physical and social sciences.

Concepts also originate in different regions and languages. For example, some have gained knowledge and have laid their foundations in the Greek language, some in Latin and some in English. Each concept founded in these languages has a background and context related to it, hence it becomes more or less difficult to use the same context in other languages.

Concepts may be used differently in the same discipline. For instance, the concept of 'function' has a different meaning in sociological theory than when used in the context of socio-economics. We understand 'function' even more differently in our day-to-day usage and it has yet other meanings in other disciplines, thus making it difficult to define it. Sometimes, a common phenomenon is defined by diverse terms and that is because they have been developed in different languages, at different times and in different regions. Thus, different terms may be used by researchers to refer to the same phenomena. Concepts are also difficult to define at times because they cannot be immediately tested empirically and are left to the judgment of the researcher. For example, the concept of social structure cannot be defined at once using empirical statistics because a groups' structure cannot be weighed and is not physically measurable.

Furthermore, concepts keep changing meanings and are developed originally in a context. As knowledge develops and research is carried forward, the meaning of concepts also changes. New knowledge adds to the new understanding of a concept and its meaning thus keeps changing. There are several levels at which concepts are developed. These are mainly two—the formal definition of concepts and the operational level of concepts. Formal definition means describing the general nature in which a concept processes while operational level means collection of data which every researcher carries out to define a concept. During the course of research, it may happen that while at the definition level a concept may appear easy, whereas it becomes complex at the operational level. For instance, Durkheim is said to have taken up the study of 'suicide', believing it was easy to define the term but during the course of research, it became difficult for him to give a definition of suicide. Also, there is no set procedure for the development of a concept which makes it difficult for researchers to attempt a definitive explanation of a concept.

There are two categories of concepts—the concepts by postulation and those by intuition. The concepts of postulation are those concepts which do not have any meaning besides the scientific theory. They have different meanings when they are used as part of two different researches; in fact, they can have dramatically different meanings and come across as binaries. A concept by intuition is one whose apprehension is made immediately. Whenever they are used, their meaning remains constant. However, both these concepts hold equal significance in social science and are not to be underestimated.

Students should remember these three features which make a good concept: First, a concept should be precise in nature; second, it should be clearly formulated and

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understandable and; third, it should not have several meanings at once and should be able to convey what it exactly was meant to explain.

Meaning of Theory

Theories are systematic statements that explain a particular segment of phenomenon by specifying certain relationships among variables.

Kerlinger has defined a theory as: '...a set of interrelated constructs (concepts), definitions and propositions that present a systematic view of phenomena by specifying relationship among variables with the purpose of explaining and predicting the phenomena.'

A theory can be explained on the following concepts:

- Theory is a set of interrelated concepts, definitions and propositions.
- The interrelated concepts and definitions in a theory help us to understand the phenomena in a systematic manner.
- Theory establishes a relationship among various variables in a systematic manner. With the help of this relationship, we can predict the future nature of the phenomena.
- A theory helps us to formulate a hypothesis on the basis of which future research can be based.

3.2.1 Theory and Facts

Theory and facts (data) are the two most important elements of a scientific work. Without them, a scientific work cannot exist. A theory may be defined as a set of systematically related propositions specifying causal relationships among variables. It is, thus, a statement held as explanation of facts or phenomena. A fact is something which is certain, definite and has no ambiguity. It is self-evident in itself. Facts are the data. A theory is a structure of ideas that explain and interpret facts. Goode and Hatt (1952) hold that theory and facts are interlinked. Facts have two important contributions to theory building.

- **Facts initiate theory:** A theory is made only by a systematic organization and analysis of facts. Without facts, no theory can exist.
- **Facts can lead to the rejection of existing theories and reformulation of new ones:** An existing theory must explain the new observed facts. If it fails to do so, it is reformulated or even rejected.

A theory also has important role to play in the study of facts:

- (i) **Theory predicts facts:** Since theory is a summation of facts, it can predict facts in unobservable areas; for example, since it is known that the introduction of western technology results in a drop in death rate, we may expect the same in any region (which is not yet studied) that the introduction of western technology will produce the same results.
- (ii) **Theory points to gaps in knowledge:** Since theory summarizes and predicts facts, it also points to areas which have not yet been explored.

An instance is Sutherland's study of criminal psychology. While reviewing the existing theories, he found that all of them dealt with crimes committed by lower-class people and not by middle-class people. The theories did not even deal with white-collar crimes. Such a gap would not have been visible if the facts were not organized into a theoretical proposition.

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Theory and fact are in constant interaction. Development in one leads to development in another. A scientific work actually depends upon a constant stimulation of facts by theory and of theory by facts.

3.2.2 Relationship between Theory and Fact

There is a close relationship between the concepts of **theory and fact**. For students, it may seem that the two concepts are more ambiguous than providing an understanding of differences between the two. Most often, they are seen as polarized concepts. A theory is only a speculation and it has to be proved before it can be called a theory definitively. When a theory is proved, it becomes a fact. Facts as a concept are definitive in nature; they are certain, cannot be questioned and are also self-evident. In the initial debates in the philosophy of science, the discipline of science was supposed to have been a matter of facts only, while the philosophers were seen as concerning themselves with theories. Therefore, when we refer to the concept of theory, we are mainly indicating at the accumulation of facts on any given subject which come together to form a theory. Thus, a fact is a concept which can be cross-checked or verified empirically. On the other hand, theory is the relationship between facts.

In practical and day-to-day usage of the terms, it has been seen that both the concepts are not in opposition to each other but are entwined. Theory ceases to be merely speculative on the day-to-day basis and it appears that philosophers work both within the realm of theories and facts. In science, facts may also be a concept which has been observed and made relevant to the theory while in other disciplines, like sociology, facts may be collected empirically to help support a theory. Therefore, one cannot assume that facts and theories are binary opposites; rather both are inter-related in a complex as well as in a meaningful manner.

3.2.3 Theory Building

A working theory or hypotheses serves a dual function in the sense that it may be accepted as pro tempore by researchers as it serves as a frame of reference to explore new possibilities and also the discovery of new empirical facts. A working theory is also used in the hope that it may later be accepted as a theory in itself. Thus, while a working theory can be put through deductive elaboration, it also acts as a tool of improvement upon theory construction.

Theory development is also a complex process since several modifications are made at every stage. Thus, there is no single cycle which can explain the process of theory construction, beginning with the formation of hypotheses and then its testing. This calls for several tests at each stage which leads to modification in the theoretical model and a near fresh start to the entire procedure. Thus, scientific enquiry continues as a process in itself and these recurring cycles of investigation best describe the process of theory development. A significant feature of theory development is the continuous process of factual findings and theoretical analyses wherein theory is tested and revised again and again. Besides, each test in itself raises new questions and new theoretical problems. The search for new knowledge is constant and thus, theory development continues as a process.

However, researchers can adopt methods to put a stop to modification as soon as a testing has been completed. It is methodologically useful to make a strict discrimination at all times before modifying a theory. It needs to be remembered that even a modified theory will have to be tested with the help of new materials.

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3.3.4 Inductive and Deductive Reasoning

The methods of scientific enquiry is essential and is needed in clear-cut and unambiguous forms to proceed with research. The empirical cycle will always undergo some changes at all stages but this will lead to greater precision and systematic approach to research. This empirical cycle takes shape in different phases. They are:

- Phase 1: Observation:** This is a method through which empirical material is collected and grouped and tentatively a hypothesis is formed.
- Phase 2: Induction:** This is the phase where hypothesis is formulated.
- Phase 3: Deduction:** Key consequences of hypotheses are derived which are in the form of testable hypotheses.
- Phase 4: Testing:** This is where hypotheses is tested against the available set of empirical material and it is checked whether the predictions are fulfilled or not.
- Phase 5: Evaluation:** In this phase, the findings of the testing procedure with regards to the theory or the hypotheses are tested and views regarding subsequent researches made.

Of key importance in this empirical cycle are the **methods of inductive and deductive reasoning**. Deductive reasoning is one where the researcher moves from the general to the specific part of the research. It is also called a kind of top-down research wherein one may begin by thinking of a theory of interest and then form a particular hypothesis. This hypothesis is then tested through collection of data and analysis is carried out to confirm or discard the original theory. The word deduction is used comprehensively because it includes both empirical specifics and derivations. Therefore, inherent to 'deduction' is the process of making concepts measurable and hypotheses testable. The whole process thus becomes operational.

Inductive reasoning is directly opposite to deductive reasoning and is also called the bottom-up approach. It tends to move from particular observations to wide generalizations. Herein, the researcher begins by having in hand some specific observations and then proceeds by seeing patterns which can be explored and tested, and finally develops conclusions and theories about the concept. Inductive reasoning is a kind of a broad, exploratory research to begin with while deductive reasoning is specific and seeks to test particular hypotheses. Social science researches can be both inductive and deductive in nature.

Check Your Progress

1. Define concepts.
2. What is 'fallacy of ramification'?
3. Give one reason as to why concepts lack clarity.
4. What is a theory?
When does a theory become a fact?

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3.4 SUMMARY

In this unit, you have learnt that:

- The basic elements that define scientific methods are known as concepts, yet all concepts are by and large only abstractions. That is to say, concepts are representative of only a part of reality.
- There is a close relationship between concept and phenomena. A discipline may be a pure or applied science, yet each will have its terms or concepts to communicate its objectives and findings. Thus, concepts help towards the comprehension of a phenomena or such aspects which we try to understand as researchers. Concepts thus symbolize a phenomena.
- The failure to separate concept from phenomena is called 'Fallacy of Ramification', i.e. believing abstractions are but phenomena in real.
- There are differences between concepts and facts. Concepts are symbolic of the empirical relationships and phenomena are in turn represented by facts. Facts thus become logical constructions of concepts and hence concepts not only define the basic scientific method but also are key to most human thoughts and communications.

Check Your Progress

8. Define reliability.
9. What is predictive validity?
10. List the three common methods of estimating reliability.

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- There are several reasons why concepts lack clarity. One of these is due to the fact that concepts develop from shared experiences and they may be shared differently in numerous languages and words.
- Concepts also develop in dissimilar frameworks since a concept is developed with certain objectives and is used only towards addressing that particular objective. With time, that concept may be used in different studies and frameworks, thereby making its exact definition difficult.
- There are two categories of concepts—the concepts by postulation and those by intuition. The concepts of postulation are those concepts which do not have any meaning besides the scientific theory.
- There is a close relationship between the concepts of theory and fact. For the students, it may seem that the two concepts are more ambiguous than providing an understanding of differences between the two.
- A theory is only a speculation and it has to be proved before it can be called a theory definitively. When a theory is proved, it becomes a fact.
- A working theory or hypotheses serves a dual function in the sense that it may be accepted as pro tempore by researchers as it serves as a frame of reference to explore new possibilities and also the discovery of new empirical facts.
- A significant feature of theory development is the continuous process of factual findings and theoretical analyses wherein theory is tested and revised again and again.
- Deductive reasoning is one where the researcher moves from the general to the specific part of the research. It is also called a kind of top-down research wherein one may begin by thinking of a theory of interest and then form a particular hypotheses.
- Inductive reasoning is directly opposite to deductive reasoning and is also called the bottom-up approach. It tends to move from particular observations to wide generalizations.
- It is important for a study to be objective in nature, no matter which discipline it represents. Whether it is natural or social science's research, a study which is subjective in nature does not produce results which can be depended upon.
- When compared with natural sciences, it is much more difficult to obtain objectivity in social sciences. This is largely because social sciences deals with humans who live in a society and pursue their own interests. Both of these are highly dynamic and their attitudes and approaches to life can change at any given time and also evolve with time.
- Objectivism puts subjectivity and objectivity together since it reasons that objective knowledge needs active, sophisticated and subjective processes like: perception, analytical reasoning, synthetic reasoning, logical deduction and the ability to differentiate essences from appearances.
- All researches have one common aim—to explore and find answers to questions which are scientific in nature. Therefore, it becomes reasonable to question how good the answer can be provided in the research. Validity and reliability are concepts which are used to judge if the answers to a research problem are good or bad.
- One of the causes why a study becomes unreliable and often a cause of invalidity is the selection of a small sample of participants.
- The test must be useful in predicting some future performance from present measures. This is known as predictive validity.

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- The Kuder–Richardson formula is used for determining the reliability coefficient in a test where the terms are scored as 0 or 1 or (right or wrong). This estimates the coefficient alpha which yields a measure of internal consistency.

3.5 KEY TERMS

- **Concepts:** The basic elements that define scientific methods are known as concepts.
- **Fallacy of ramification:** The failure to separate concept from phenomena is called ‘fallacy of ramification’, i.e. believing abstractions are but phenomena in real.
- **Deductive reasoning:** It is one where the researcher moves from the general to the specific part of the research.
- **Value neutrality:** It is the duty of sociologists to strive to be impartial and overcome their biases as they conduct their research.
- **Validity:** It means that the test must measure what it purports to measure.
- **Reliability:** It implies the consistency with which a test measures what it seeks to measure.
- **Predictive validity:** The research must be useful in predicting some future performance from present measures. This is known as predictive validity.
- **Pragmatic validity:** This refers to the usefulness of an instrument as an indicator or as predictor of some behaviour in the future.

3.6 ANSWERS TO ‘CHECK YOUR PROGRESS’

1. The basic elements that define scientific methods are known as concepts.
2. The failure to separate concept from phenomena is called ‘Fallacy of Ramification’, i.e. believing abstractions are but phenomena in real.
3. There are several reasons why concepts lack clarity. One of these is due to the fact that concepts develop from shared experiences and they may be shared differently in numerous languages and words.
4. A theory is only a speculation and it has to be proved before it can be called a theory definitively. When a theory is proved, it becomes a fact.
5. Being objective in social science means being able to check and examine the evidences which the study has produced. An objective study is free from personal biases and beliefs of the researcher. Objective studies are not speculative in nature but are dominated by actual observations.
6. Biases can also enter during the supply of information because many times information is collected by those who may carry their own prejudices. They may present information which is suited to their needs, thus keeping the wholesome information out of reach of the researcher.
7. Objectivism is the highest form of the subjects being studied as part of research methodology.
8. Reliability implies the consistency with which a test measures what it seeks to measure.

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9. Research must be useful in predicting some future performance from present measures. This is known as predictive validity.
10. There are three common methods of estimating reliability:
 - Retest reliability
 - Internal consistency reliability
 - Parallel forms/or alternate forms/or equivalent forms

3.7 QUESTIONS AND EXERCISES

Short-Answer Questions

1. ‘Concepts symbolize a phenomena.’ With reference to this statement, describe the relationship between concept and phenomena.
2. Differentiate between concepts and facts.
3. What are the levels at which concepts are developed?
4. List the two categories of concepts.
5. What is the relationship between theory and fact?
6. Differentiate between deductive and inductive reasoning.
7. State the various ways by which subjectivity can be removed from research.
8. What is value neutrality?
9. What is validity? What are its types?
10. What is reliability? What are the tests of reliability?

Long-Answer Questions

1. Discuss the term concept in detail.
2. Evaluate the relationship between concept, fact and theory. Also, discuss the function of theory building.
3. Assess the differences between inductive and deductive reasoning.
4. Critically analyse the debate on objectivity and subjectivity in the field of research.
5. Explain the concepts of validity and reliability with regard to research.

3.8 FURTHER READING

- Chawla, D. and N. Sondhi. 2011. *Research Methodology*. New Delhi: Vikas Publishing House.
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UNIT 4 CONCEPT, THEORY AND FACT -II

Structure

- 4.0 Introduction
- 4.1 Unit Objectives
- 4.2 Objectivity-Subjectivity Debate
 - 4.2.1 Value Neutrality
 - 4.2.2 Problems of Subjectivity and Objectivity
- 4.3 Validity and Reliability
 - 4.3.1 Tests of Validity
 - 4.3.2 Tests of Reliability
- 4.4 Summary
- 4.5 Key Terms
- 4.6 Answers to 'Check Your Progress'
- 4.7 Questions and Exercises
- 4.8 Further Reading

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4.0 INTRODUCTION

The previous unit dealt with the meaning, characteristics and objectives of scientific research; aims and types of social research; major steps in social research and the concept of hypothesis. In this unit, you will learn about the meaning of the terms concept, fact and theory; inductive and deductive reasoning; theory building; objectivity-subjectivity debate; and validity and reliability.

The basic elements that define scientific methods are known as concepts, yet all concepts are by and large only abstractions. Facts are logical constructions of concepts. A close relationship exists between a theory and fact where a theory is only a speculation and it has to be proved before it can be called a theory definitively. When a theory is proved, it becomes a fact.

There are various methods of scientific enquiry. The two most important ones are—deductive and inductive reasoning. Deductive reasoning is one where the researcher moves from the general to the specific part of the research. Inductive reasoning is also called the bottom-up approach. It tends to move from particular observations to wide generalizations.

There is an ongoing debate on the subject of objectivity or subjectivity of research carried out by researchers where the researchers are supposed to be unbiased and objective rather than subjective. Herein, value neutrality is the duty of sociologists to strive to be impartial and overcome their biases as they conduct their research.

Every good measuring tool must be subjected to the tests of validity, reliability and practicality. Validity means that the test must measure what it purports to measure. Reliability implies the consistency with which a test measures what it seeks to measure.

4.1 UNIT OBJECTIVES

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

- Discuss the term concept in detail
- Evaluate the relationship between concept, fact and theory
- Discuss the function of theory building
- Assess the differences between inductive and deductive reasoning
- Analyse the debate on objectivity and subjectivity in the field of research
- Explain the concepts of validity and reliability with regard to research

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Check Your Progress

1. Define concepts.
2. What is 'fallacy of ramification'?
3. Give one reason as to why concepts lack clarity.
4. What is a theory? When does a theory become a fact?

4.2 OBJECTIVITY-SUBJECTIVITY DEBATE

It is important for a study to be objective in nature, no matter which discipline it represents. Whether it is natural or social science's research, a study which is subjective in nature does not produce results which can be depended upon. That is because being objective in social science means being able to check and examine the evidences which the study has produced. An objective study is free from personal biases and beliefs of the researcher. Objective studies are not speculative in nature but are dominated by actual observations.

When compared with natural sciences, it is much more difficult to obtain objectivity in social sciences. This is largely because social sciences deals with humans who live in a society and pursue their own interests. Both of these are highly dynamic and their attitudes and approaches to life can change at any given time and also evolve with time. Therefore, while objectivity is important, it is difficult to obtain the same in social sciences

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as personal views and biases often enter the researcher's work. There are hindrances like emotional values, complex subjects, uniformity problems, self-interest, lack of time for research, and bias and prejudices. Among all these, the most severe in terms of research are prejudices and biases which can greatly affect the nature of the study. These biases can enter different stages of research, like during the collection of the sample, in the choice of the participants, during data collection, analysis and finally in the findings.

4.2.1 Value Neutrality

Value neutrality is the duty of sociologists to strive to be impartial and overcome their biases as they conduct their research. A researcher can easily mix his past experiences and present them as part of the present study. This leads to inclusion of subjectivity in the study. Biases can also enter during the supply of information because many times information is collected by those who may carry their own prejudices. They may present information which is suited to their needs, thus keeping the wholesome information out of reach of the researcher. All these can increasingly influence the findings of the study and mar the objectives with which it was undertaken in the first place. There are several ways by which subjectivity can be removed from research. These are, first, depending less on the investigation. This means that while data is critical to social science research, the researcher can avoid hiring other investigators and have first-hand information of the field to avoid subjectivity. Second, use of statistical measurements and methods can be made wherein data can be correlated and checked to remove subjectivity. Third, concepts and terms could be standardized to avoid multiple usage and inculcate clear and precise use to suit the views of the researcher. Fourth, the introduction of a questionnaire through which information is collected can lead to clarification and also provision of matter which can be cross-checked any time. Fifth, at various stages, the researcher can employ counter-checks and compare findings at several stages to avoid biases and prejudices from entering the study. Another method is that of random sampling with which the researcher can select participants from different shades to avoid his own prejudice that might enter the study during the collection of the sample.

4.2.2 Problems of Subjectivity and Objectivity

Qualitative methodology is familiar with the fact that the subjectivity of the researcher is a deep ingredient of his scientific research. Everything is guided by subjectivity, beginning from the choice of topic that one studies, to devising hypotheses, to selection of methodology and interpretation of data. Qualitative methodology motivates researchers to mirror the values and objectives brought by them into their research and the manner in which they influence the research project. It also motivates other researchers to replicate the values used by a particular investigator.

The most important issue that comes up when subjectivity is recognized, is its impact on objectivity. Two types of arrangements have been expressed. Many qualitative researchers make subjectivity and objectivity counterbalance each other. It is believed that objectivity negates subjectivity. The reason for this is because it makes the observer an inert recipient of external information, without an agency. The subjectivity of the researcher is said to negate the possibility of objectivity, knowing a social psychological world. The investigator's values are said to define the world that is studied. It never happens that one really sees or talks about the world, per se. However, one only sees and talks about what one's values dictate.

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Subjectivity is usually considered as the most essential and initiating part of qualitative methodology. Nevertheless, this is not true. Qualitative methodology also has traces of objectivity. Objectivity indicates that the subjectivity of a researcher can empower him to precisely understand the world in its true state. Beyond doubt, subjectivity can cause prejudice to affect the researcher and rule out objective understanding of a subject's psychological reality. However, this is not unavoidable. In the true sense, one of the benefits of getting to recognize subjectivity is to reflect on whether it makes objective comprehension easy or obstructs it. Distorting values can then be replaced by values that improve objectivity.

Objectivism puts subjectivity and objectivity together since it reasons that objective knowledge needs active, sophisticated and subjective processes like: perception, analytical reasoning, synthetic reasoning, logical deduction and the ability to differentiate essences from appearances. On the other hand, subjective processes can augment objective conception of the world.

Objectivism is the highest form of the subjects being studied as part of research methodology. It considers psychological reality as something meaningful and important which must be accurately comprehended. Subjectivism either denies a psychological reality to subjects, or else makes it unknowable. The psychology of other people is clouded by the subjectivity of the observer and is not recognized for what it (truly) is.

4.3 VALIDITY AND RELIABILITY

All researches have one common aim—to explore and find answers to questions which are scientific in nature. Therefore, it becomes reasonable to question how good the answer can be provided in the research. Validity and reliability are concepts which are used to judge if the answers to a research problem are good or bad. Validity thus is an all-encompassing concept in research which is used to find out whether the answers yielded by a study are sound in nature or not. If it seems that the answers to be given by the research will be close to the objectives of the research, then the research can be said to be valid in nature. As a concept, validity can be used to judge a research on the whole or it can be used to study one or another area of research. By using the concept of validity, students should be able to judge whether their study is valid in nature and its conclusions are sound or not. **Validity** means that the test must measure what it purports should measure. **Reliability** implies the consistency with which a test measures what it seeks to measure.

Reliability is a constituting part of the concept of validity. In essence, reliability is the degree of random variation in the results of a study. When a study produces highly unreliable results, a study is said to be invalid. For instance, in a study, if results indicate high I.Q. levels and low I.Q. levels of a same child at different times during the study, the results can be said to be unreliable and the study using the test to be invalid.

There are two key sub-concepts of validity that can be used for research as a whole. One of these is construct or external validity. It can often happen that while a researcher may have tried to make the study absolutely accurate and error-free, it cannot be applied to the original research questions. For instance, the I.Q. tests of children of one country, say India, may be inapplicable to measure the intellectual capacity of children of other countries or cultures. Similarly, the sexual practices of people of one

Check Your Progress

- 5. Why does objectivity in social science research take an upper hand over subjectivity?
- 6. How do biases enter during the supply of information while conducting a research?
- 7. What is the highest form of the subjects being studied as part of research methodology?

culture may not be suitably indicative of those people of a different culture. All these may yield a research externally invalid.

A research may also be called invalid when the procedures internal to it become invalid. For instance, a study proposes to find out the effects of early stair-climbing on a group of infants. This will remain invalid unless the results are not compared with those groups of infants which start climbing stairs late as compared to the previous group or those who obtain no training in this regard. This may help in making a comparison between the two groups; show the effects of training for stair-climbing, wherein it may eventually be found that it has no long-term benefit and untrained infants tend to catch up soon with their trained counterparts.

One of the causes why a study becomes unreliable and often a cause of invalidity is the selection of a small sample of participants. For instance, a sample of ten people used to find out the voting patterns in a general election of a country is likely to be highly unrepresentative because all different samples which will have ten participants will yield different answers to the research questions.

Different elements which constitute a study may be called as invalid or valid or reliable or unreliable. We will now look at the operative definitions of all these parts of the studies. Whenever a particular set of conditions of a study, that is, the measuring device or a definition, gives the same output as the input, it is called reliable. Reliability can also be identified as consistency or repeatability and it may be applied either to definitions in use or measuring devices. An operational definition can be called very reliable when its application produces the same results every time. This can be thought of as a weighing scale which is considered reliable if it gives the same weight every time an iron bar is placed upon it. Or, an I.Q. test is considered reliable if participants score the same score every time they are tested. However, it might be easy to check whether the weighing scale is reliable by simply placing the same iron bar on it. But it may be difficult to check the reliability of an I.Q. test because the same participants may give better answers in the second round of the test. This can be rectified by dividing the I.Q. test itself into two halves and check whether the scores of the two tests are similar or not.

Many times operational definitions or measurements may turn out to be invalid even though they may be reliable initially. They may lack validity and therefore, a definition can be said to be valid only when it is able to classify what the researcher wants to classify. For instance, an I.Q. test can only be said to be valid when it is able to measure the success of students in future because this is what was intended for its development. A poll conducted before the elections is considered valid only if it is able to pick out the poll winner. In the hindsight, there can be no one rule for deciding whether an operational definition may be valid or not. The decision lies in the judgment of the researcher. The validity has to match with the objectives of the study and this can be used as one of the rules to check the validity of the operational definition. Also, the researcher can think of the factors that the readers of the study will have in mind when its objectives are being detailed to them.

4.3.1 Tests of Validity

A simple way to determine validity is to ask the question: Is one measuring what is being thought that the test is measuring? Another way to determine the validity of a test is the accuracy with which specific predictions can be made from the test scores. This is determined by comparing the scores obtained with some external test scores as standard.

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This means one can assess the individual's present status or predict his/her future status with respect to some type of functioning. This comparison with other relevant evidence is one of the better ways of establishing the validity of an instrument.

Types of Validity

1. **Content validity:** This implies the extent to which the measuring instrument has covered adequately all the aspects of the topic that is to be measured. If the measure includes a representative sample of the population, then the content validity would be assumed to be good. This can be determined by a panel of judges who evaluate the contents of an instrument for yielding the measures the tool is intended to measure. Another way of establishing the content validity is intuitive judgments involving the theme of the measuring tool.
2. **Criterion-based validity:** Here the success of the measuring instrument is determined by the ability of the scores obtained to predict some outcomes of a current condition. For example, those who train hard can be predicted to be winners. The extent of training can thus be reflected in the number of winners.
3. **Predictive validity:** The test must be useful in predicting some future performance from present measures. This is known as predictive validity.
4. **Construct validity:** This involves finding out if the individual possesses a trait or a characteristic. The degree of the existence of this trait is also of interest to the assessor. This is the construct on which a test rests; for example: anxiety, intelligence, etc. So, the instrument is validated against the construct. The greater the ability of the instrument measuring the construct, the higher will be the validity of the tool.
5. **Pragmatic validity:** This refers to the usefulness of an instrument as an indicator or as predictor of some behaviour in the future. So, the validity of a measure rises from this ability of the tool. Under this approach to validity, two sub-types are included:
 - *Concurrent validity:* This seeks to see how closely the scores relate to other known measures of validity.
 - *Predictive validity:* Here the object of the scores is to predict the future situation/behaviours on the basis of the scores obtained from the tool, at the present.

If these criteria are met by a tool used for measurement, then the instrument is thought to be valid. The measures obtained from such a tool can be viewed as a correct estimate of the feature under assessment.

4.3.2 Tests of Reliability

The test of reliability of a measuring device is its ability to yield consistent results from one set of measures to another.

A valid instrument is always reliable

A reliable instrument is not always a valid one. For example, a machine may consistently under weigh objects by 2 kg. It is a *reliable* machine, but it is not *valid* as a good measure of weight.

If an instrument is reliable, then temporary and extraneous factors would not affect the measures obtained.

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There are two aspects to reliability. These are:

- **Stability:** The extent to which consistent results are obtained with repeated measurements with the same instrument on the same individual. A measure of stability is obtained by comparing the results of repeated measurements.
- **Equivalence:** This is estimated by comparing the measures obtained by two assessors on the same aspect/situation or individual.

Reliability can be enhanced by three procedures. These are:

- By standardizing the conditions under which measurements are made. Here, all extraneous factors can be kept under control.
- By systematizing the directions for measurement.
- By training personnel suitably, e.g., technicians who are trained for measuring blood pressure. Also, having larger samples from the person on whom the measurement is done.

Types of Reliability

There are three common methods of estimating reliability:

- Retest reliability
 - Internal consistency reliability
 - Parallel forms/or alternate forms/or equivalent forms. Here, a single form of the test is administered twice on the same sample with a reasonable time gap.
1. **Retest reliability:** Two measures yield independent sets of scores. The two scores when correlated would give the value of the reliability coefficient. Such a coefficient is also known as the **temporal stability coefficient**. This means how far the examinees retain their relative position as measured in terms of test scores over a given period of time. The ideal time gap between the two administrations is about fifteen days.
 2. **Internal consistency reliability:** This indicates the homogeneity of the test. If all the items of a test measure the same function or trait, then the test is seen to be homogeneous and the internal consistency would be high. The most common way of determining internal consistency reliability is by the split-half method. Here the items to be tested are divided into two equal or nearly equal halves. Another way to split a test is by using the odd and even numbered items. This method is preferred to the regular split-half method because in a power test, the first half would normally be made up of the easier items while the second half would have the tougher items. The odd numbers 1, 3, 5, 7, 9 and so on and even numbers 4, 6, 8, and so on would balance the items. Each examiner would receive two scores, i.e., the scores of the odd and those of the even numbers of a given test. Thus, from a single administration of the same test, two sets of scores are generated. A 'product moment correlation' is computed to obtain the reliability of the half test. On the basis of the reliability of this half test, the reliability of the whole test is estimated. The Spearman/Brown formula is used for estimating the reliability of the whole test.

This is a useful method as it eliminates two administrations of the same test. A quick estimate of reliability is possible. This is a kind of on-the-spot reliability measure. The demerit of this method is that it cannot be used for power tests.

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The Kuder-Richardson formula is used for determining the reliability coefficient in a test where the terms are scored as 0 or 1 or (right or wrong). This estimates the coefficient alpha which yields a measure of internal consistency.

3. **Alternate forms reliability:** These are also known as parallel forms or equivalent forms or comparable forms reliability. This requires that the test be developed in two forms which are comparable or equivalent. Two forms of the test are administered to the same sample either immediately the same day or in a time interval of a fortnight. When the reliability is calculated on the basis of data obtained from the two administrations of the test, it is the alternate form reliability. Pearson coefficient (*r*) between two sets of scores obtained from two equivalent forms becomes the measure of reliability. Such a coefficient is known as the **coefficient of equivalence**. Alternate forms reliability measures the consistency of the examinee's scores between two administrations of parallel forms of a single test.

The biggest problem with this procedure is making the two forms of a test, truly equivalent.

Criteria for judging whether the forms are parallel are:

- The number of items in both the form should be same.
- The item-difficulty levels in both the forms should be similar.
- Mode of administration of both forms should be the same.

4. **Scorer reliability:** This kind of reliability is important in tests of creativity, projective tests, etc. This is the reliability which can be estimated by having a sample of test independently scored by two or more examiners. The two sets of scores obtained by each examiner are completed and the resulting correlation coefficient is known as scorer reliability.

Test-Retest reliability, internal consistency reliability, and parallel forms reliability all express reliability in terms of the correlation coefficient.

4.4 SUMMARY

In this unit, you have learnt that:

- The basic elements that define scientific methods are known as concepts, yet all concepts are by and large only abstractions. That is to say, concepts are representative of only a part of reality.
- There is a close relationship between concept and phenomena. A discipline may be a pure or applied science, yet each will have its terms or concepts to communicate its objectives and findings. Thus, concepts help towards the comprehension of a phenomena or such aspects which we try to understand as researchers. Concepts thus symbolize a phenomena.
- The failure to separate concept from phenomena is called 'Fallacy of Ramification', i.e. believing abstractions are but phenomena in real.
- There are differences between concepts and facts. Concepts are symbolic of the empirical relationships and phenomena are in turn represented by facts. Facts thus become logical constructions of concepts and hence concepts not only define the basic scientific method but also are key to most human thoughts and communications.

Check Your Progress

8. Define reliability.
9. What is predictive validity?
10. List the three common methods of estimating reliability.

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- There are several reasons why concepts lack clarity. One of these is due to the fact that concepts develop from shared experiences and they may be shared differently in numerous languages and words.
- Concepts also develop in dissimilar frameworks since a concept is developed with certain objectives and is used only towards addressing that particular objective. With time, that concept may be used in different studies and frameworks, thereby making its exact definition difficult.
- There are two categories of concepts—the concepts by postulation and those by intuition. The concepts of postulation are those concepts which do not have any meaning besides the scientific theory.
- There is a close relationship between the concepts of theory and fact. For the students, it may seem that the two concepts are more ambiguous than providing an understanding of differences between the two.
- A theory is only a speculation and it has to be proved before it can be called a theory definitively. When a theory is proved, it becomes a fact.
- A working theory or hypotheses serves a dual function in the sense that it may be accepted as pro tempore by researchers as it serves as a frame of reference to explore new possibilities and also the discovery of new empirical facts.
- A significant feature of theory development is the continuous process of factual findings and theoretical analyses wherein theory is tested and revised again and again.
- Deductive reasoning is one where the researcher moves from the general to the specific part of the research. It is also called a kind of top-down research wherein one may begin by thinking of a theory of interest and then form a particular hypotheses.
- Inductive reasoning is directly opposite to deductive reasoning and is also called the bottom-up approach. It tends to move from particular observations to wide generalizations.
- It is important for a study to be objective in nature, no matter which discipline it represents. Whether it is natural or social science's research, a study which is subjective in nature does not produce results which can be depended upon.
- When compared with natural sciences, it is much more difficult to obtain objectivity in social sciences. This is largely because social sciences deals with humans who live in a society and pursue their own interests. Both of these are highly dynamic and their attitudes and approaches to life can change at any given time and also evolve with time.
- Objectivism puts subjectivity and objectivity together since it reasons that objective knowledge needs active, sophisticated and subjective processes like: perception, analytical reasoning, synthetic reasoning, logical deduction and the ability to differentiate essences from appearances.
- All researches have one common aim—to explore and find answers to questions which are scientific in nature. Therefore, it becomes reasonable to question how good the answer can be provided in the research. Validity and reliability are concepts which are used to judge if the answers to a research problem are good or bad.
- One of the causes why a study becomes unreliable and often a cause of invalidity is the selection of a small sample of participants.
- The test must be useful in predicting some future performance from present measures. This is known as predictive validity.

NOTES

- The Kuder–Richardson formula is used for determining the reliability coefficient in a test where the terms are scored as 0 or 1 or (right or wrong). This estimates the coefficient alpha which yields a measure of internal consistency.

4.5 KEY TERMS

- **Concepts:** The basic elements that define scientific methods are known as concepts.
- **Fallacy of ramification:** The failure to separate concept from phenomena is called 'fallacy of ramification', i.e. believing abstractions are but phenomena in real.
- **Deductive reasoning:** It is one where the researcher moves from the general to the specific part of the research.
- **Value neutrality:** It is the duty of sociologists to strive to be impartial and overcome their biases as they conduct their research.
- **Validity:** It means that the test must measure what it purports to measure.
- **Reliability:** It implies the consistency with which a test measures what it seeks to measure.
- **Predictive validity:** The research must be useful in predicting some future performance from present measures. This is known as predictive validity.
- **Pragmatic validity:** This refers to the usefulness of an instrument as an indicator or as predictor of some behaviour in the future.

4.6 ANSWERS TO 'CHECK YOUR PROGRESS'

1. The basic elements that define scientific methods are known as concepts.
2. The failure to separate concept from phenomena is called 'Fallacy of Ramification', i.e. believing abstractions are but phenomena in real.
3. There are several reasons why concepts lack clarity. One of these is due to the fact that concepts develop from shared experiences and they may be shared differently in numerous languages and words.
4. A theory is only a speculation and it has to be proved before it can be called a theory definitively. When a theory is proved, it becomes a fact.
5. Being objective in social science means being able to check and examine the evidences which the study has produced. An objective study is free from personal biases and beliefs of the researcher. Objective studies are not speculative in nature but are dominated by actual observations.
6. Biases can also enter during the supply of information because many times information is collected by those who may carry their own prejudices. They may present information which is suited to their needs, thus keeping the wholesome information out of reach of the researcher.
7. Objectivism is the highest form of the subjects being studied as part of research methodology.
8. Reliability implies the consistency with which a test measures what it seeks to measure.

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9. Research must be useful in predicting some future performance from present measures. This is known as predictive validity.
10. There are three common methods of estimating reliability:
 - Retest reliability
 - Internal consistency reliability
 - Parallel forms/or alternate forms/or equivalent forms

4.7 QUESTIONS AND EXERCISES

Short-Answer Questions

1. 'Concepts symbolize a phenomena.' With reference to this statement, describe the relationship between concept and phenomena.
2. Differentiate between concepts and facts.
3. What are the levels at which concepts are developed?
4. List the two categories of concepts.
5. What is the relationship between theory and fact?
6. Differentiate between deductive and inductive reasoning.
7. State the various ways by which subjectivity can be removed from research.
8. What is value neutrality?
9. What is validity? What are its types?
10. What is reliability? What are the tests of reliability?

Long-Answer Questions

1. Discuss the term concept in detail.
2. Evaluate the relationship between concept, fact and theory. Also, discuss the function of theory building.
3. Assess the differences between inductive and deductive reasoning.
4. Critically analyse the debate on objectivity and subjectivity in the field of research.
5. Explain the concepts of validity and reliability with regard to research.

4.8 FURTHER READING

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