B.A. SEMESTER-V, SOCIOLOGY, COURSE NO. : SO-501

Directorate of Distance & Online Education

UNIVERSITY OF JAMMU

JAMMU

SELF LEARNING MATERIAL

B.A. SEMESTER - V

SUBJECT : SOCIOLOGY **UNIT : I - V**

COURSE NO. : SO-501 **LESSON NO. : 1-18**

DR. ANURADHA GOSWAMI
Course Co-ordinator

http:/www.distanceeducationju.in
Printed & Published on behalf of the Directorate of Distance & Online Education, University of Jammu by the Director, DD&OE, University of Jammu, Jammu.

SOCIAL RESEARCH

Course Contributors :

- Prof. Vishav Raksha
- Dr. Hema Gandotra
- Dr. Kuljit Singh
- Dr. Neharica Subash
- Dr. Nisha Sharma
- Dr. Neha Vij

Format & Content Editing

- Dr. Neha Vij

- Printed by : Sushil Printers / 2024 / 100 Books

SOCIOLOGY

B. A. Semester - V

Examination to be held in the years 2019 & onwards

Course No. SO-501 (Theory) | **Title : Social Research**

Duration : 3 hrs | Total Marks : 100

Credit : 4 | Theory Examination : 80

Internal Assessment : 20

Objectives :

1. To train the students to enable them in pursue research future career.
2. To acquaint the students with various survey research techniques

Unit - I **Social Research :**

1.1 Meaning, objectives and significance of research

1.2 Steps in Research Process

1.3 Hypothesis

1.4 Concept of Objectivity

1.5 Methodology

Unit - II **Types of Research :**

2.1 Basic and Applied

2.2 Exploratory

2.3 Descriptive

2.4 Experimental

Unit - III **Sampling Design :**

3.1 Meaning and Significance of Sampling

3.2 Probability Sampling-Simple random,

Complex-Cluster, systematic and stratified.

3.3 Non-Probability sampling-accidental,

quota and purposive sampling.

Unit - IV Techniques of Data Selection :

4.1 Social Survey Data-primary and secondary

4.2 Observation-participatory and Non-participatory

4.3 Interview and its types

4.4 Schedule and questionnaire

Unit - V Basic Statistics :

5.1 Meaning of Central tendency : Mean, Median, Mode

5.2 Presentation of Data : Graphs and Histograms

Note for Paper Setting :

The question paper for each course will consist of two sections A and B viz.

Section A will consist of 10 Long answer type questions, two from each unit with internal choice. Each question will be of 10 marks. The candidate will be required to answer 5 questions. One from each unit. Total weightage will be of 10×5 = 50. The length of each answer should be of 500 words approximately.

Section B will consist of 10 short answer type questions, two from each unit with internal choice. Each question will be of 6 marks. The candidate will be required to answer 5 questions, one from each unit. Total weightage will be 6×5 = 30. The length of each answer shall be of 150 words approximately.

- **Internal Assessment (Total 20 Marks)**

Books Prescribed :

1.	F.N. Kerlinger	:	Methods & Issues in Social Research.
2.	K. Bailey	:	Methods of Social Research.
3.	Goode and Hatt	:	Methods in Social Research.
4.	P.V. Young	:	Scientific Social Surveys & Research.
5.	Cohen & Nagel	:	An introduction to logic and Scientific method.
6.	Kothari	:	Research Methods.
7.	Jaspal Singh	:	Introduction to Social Research.
8.	Ram Ahuja	:	Research Methodology.
9.	S.P. Gupta	:	Statistical Methods.

SOCIAL RESEARCH

CONTENTS

MEANING, OBJECTIVES AND SIGNIFICANCE OF RESEARCH

STRUCTURE

1.1 INTRODUCTION

Many a time we make certain statements which we have not to prove that they are true. They are based either on common sense or on practical observations and experiences on social life, though sometimes they may be based on wisdom too. However, often they are based on ignorance, prejudices and mistaken interpretation. Common sense knowledge, based on the accumulated experiences, prejudices and beliefs of the people, is often contradictory and inconsistent on the other hand, scientific observations are based on verifiable evidence or systematic body of proof that can be cited. For example, some common sense statement may be quoted here: man is more

intelligent than woman, married people remain more happy than single people, high caste people are more talented than low caste people, the rural people are more hard working than urban people, urban people are more BJP-oriented than congress-oriented; and the like. Contrary of this, the scientific research or scientific inquiry finds that woman is as intelligent as man; there is no association between happiness and remaining married or unmarried by a person; caste does not determine individual's efficiency; hard work is not related to environment alone, and urban people are not necessarily BJP-oriented. Thus a statement made on common sense basis may be just a guess, a hunch, or a haphazard way of saying something generally based on ignorance, bias, prejudice or mistaken interpretation, though occasionally it may be wise, true, and a useful bit of knowledge. At one time, common sense statements might have preserved folk wisdom but today, scientific research has become a common way of seeking truths about our social world.

1.2 OBJECTIVES

This unit aims at presenting the meaning, objectives and significance of research

After reading this unit you will be able to understand

1. Meaning of Research
2. Objectives of Research
3. Significance of Research
4. Different definitions of Research

1.3 MEANING AND DEFINITIONS OF RESEARCH :

Research in common parlance refers to a search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic. Infact, research in an art of scientific investigation.

The Advanced Learner's Dictionary of current English lays down the meaning of research as a "careful investigation or inquiry specially through search for new facts in any branch of knowledge".

Redman and Mory define research as a "systematised effort to gain new knowledge." Some people consider research as a movement, a movement from the known to the unknown. It is actually a voyage of discovery. We all possess the vital instinct of inquisitiveness for, when the unknown confronts us, we wonder and our inquisitiveness makes us probe and attain full and fuller understanding of the unknown. This inquisitiveness is the mother of all knowledge and the method when men employ for obtaining the knowledge of whatever the unknown, can be termed as research.

While talking of research, sometimes we talk of empirical research and sometimes of library research, historical research, social research, and so on.

Empirical research involves observation of facts or interaction with people.

Library research is done in library situations.

Historical research is the study of history (e.g., functioning of caste system in different periods of history) or biographical research (e.g. research into the life and times of Mahatma Gandhi).

Social research is a research that focuses on the study of human groups or the process of social interaction.

Scientific research is building of knowledge through collection of empirically verifiable facts. The term "verifiable" here means "which can be checked by others for accuracy".

Kerlinger has defined scientific research as "a systematic controlled empirical and critical investigation of hypothetical propositions about the presumed relations among phenomena". Three points that have been emphasised here are:

(i) it is systematic and controlled i.e. the investigation is so ordered that investigators can have confidence in research outcomes. In other words, the research situation is tightly disciplined.

ii) investigation is empirical, i.e. subjective belief is checked against objective reality; and

iii) It is critical, i.e. the research is critical not only of the results of his own inquiry but of the research results of others too. Though it is easy to err, to exaggerate, to over-generalise when writing up one's own work, it is not easy to escape the scientific eyes of others.

Royce A Singleton and Bruce C. Straits have said that "Scientific social research consists of the process of formulating and seeking answers to questions about the social world". For example, why do husbands batter their wives? Why do people take drugs? What are the consequences of population explosion and so on. Similarly, the issue of inquiry may be as rural poverty, urban slums, youth crime, political corruption, exploitation of the weak, environmental pollution and the like. To answer these questions, social scientists have devised basic guidelines, principles and techniques. Scientific social research thus investigates any curiosity about social phenomena, utilising scientific methods. Scientific sociological research, broadly speaking is concerned with discovering, organising and developing systematic reliable knowledge about society or social life, social action, social behaviour, social relations, social groups (like families, castes, tribes, communities, etc.), Social orgainsation (like social, religious, political business etc.) and social system and social structures.

Theodorson and Theodorson have maintained that scientific method is "building of a body of scientific knowledge through observation, experimentation, generalisation and verifications". Their contention is that scientific inquiry develops knowledge experienced through the senses i.e. which is based on empirical evidence. According to Manheins "Scientific Research involves a method characterised by objectivity, accuracy and systematisation". Objectivity culminates biases in fact-collection and interpretations: Accuracy makes sure that things are actually as described Systmatisation aims at consistency and comprehension.

The assumption is that any statement pertaining to any social phenomena made on the basis of scientific inquiry can be accepted as true and meaningful, if it is empirically variable. Thus, individuals idiosyncratic observations not shared by all scientists are not regarded as "Scientific facts" e.g. a statement that "skilled workers are more indisciplined than non-skilled workers" lacks empirical validity hence no one will accept it as a "scientific fact". But if a statement is given that the important cause of child

delinquent behaviour is a disorganised family, it will be taken as scientific, considering it a proposition which has been found valid in a number of studies. "About whom" the facts will be collected in a scientific inquiry will depend open the focus of discipline to which the research belongs. If the researcher is a sociologist, he will collect facts about social phenomenon or social world. But if he is a student of business administration, he will collect facts pertaining to "different aspects of business like finance marketing, personnel, and the process that facilitates the managerial division making problem solving". In sociology, social inquiry will help the researcher and the people to understand the social phenomenon (say a social problem like exploitation of the weak, poverty, political corruption, etc. or the structure of political parties, or the functioning of political elites or social institutions in a village community and so on) or to understand when the behaviour of an individual in a group (crowd) is different from the one when he is in isolation (crowd behaviour) or how the behaviour patterns of a number of persons change when they respond to a common stimulus (collective behaviours), or why and how the patterns of interaction within a small group or of interrelationships of one group with other groups are effective in communication and decision making process (group dynamics).

In business administration, according to Zikmund, the scientific inquiry will help managers to classify their objectives and decisions, e.g. a managers of an organisation wants to find out why has the morale of the subordinates declined. It is because the overtime has been totally stopped or the employees for higher posts are directly recruited and the serving employees have no opportunities for seeking higher posts or the employer has developed the tendency of appointing persons on contract basis, or the credit facility provided earlier by the organisation has been stopped, or the profits are not being shared by the employer with the employees, or the employer has refused to provide housing facilities even to senior employees, and so forth. Thus, while the major area of inquiry research for a sociologists would be individuals, groups, organisations, institutions, communities, systems, structures and societies, for social inquiry or research in business administration the major areas would be accounting personnel, sales and marketing (advertising buyer's behaviour) responsibility (legal, constraints) of general business (i.e. location, trend, import and export etc.).

Although scientific research method depends on the collection of empirical facts, yet facts alone do not constitute a science. For meaningful understanding facts must be ordered in some fashion, analysed, generalized and related to other facts. Thus, theory construction is a vital part of the scientific inquiry.

Since facts collected and findings evolved through the scientific method are interrelated with the previous findings of other scholars or earlier theories, scientific knowledge is a cumulative process.

The scientific method could either be an inductive method or the deductive method.

Inductive method involves establishing generalisations i.e. building generations inferred from specific facts, or drawing particular principles from general instances, while deductive method involves testing generalisations i.e. it is the process of reasoning from general principles to particular instances :

Research and theory are not opposed for each other. Research leads to theory and theory to Research. In fact, descriptive research leads to explanatory research which leads to theoretical research.

According to Singleton and Straits, there are four research strategies for understand the social world :

(i) Experiment (iii) Field Research

(ii) Surveys (iv) Use of available data.

Experimental research offers the best approach for investigating the causes of phenomenon. In the experiment, the researcher systematically manipulates some feature of the environment and then observes whether a systematic change follows in the behaviour under study.

Survey research involves the administration of questionnaire or interviewing relatively large groups of people. Field research is engaging oneself in naturally occurring set of events in order to gain first hand knowledge of the situation. The available data are the data that have been generated for purposes other than those for which the researcher is using them e.g. written records, newspapers, government documents books, diaries etc.

1.4 OBJECTIVES OF SOCIAL RESEARCH

• The objectives of social research coincide with the type of research, i.e. whether it is exploratory research or explanatory research or descriptive research. In other words, it depends upon the general goals, the academic goals, the theoretical goals and the pragmatic goals of research. Broadly speaking the important aims of social research are:

- To understand the functioning of society .
- To study individual behaviour and social action.
- To evaluate social problems, their effect on society, and to find out possible solutions.
- To explore social reality and explain social life.
- To develop theories.

Becker and Sarantakas have referred to the following goals of social research:

General Goals : Understanding for its own sake.

Theoretical goals : Verification, qualification, modification or discovery of a theory.

Pragmatic goals : Solution of social problems.

Political goals : Development of social policy, evaluation of programmes, planning of reconstruction, empowerment and liberation.

Sometimes the aims of social research coincide with the motives of social research but not always. The motives can be intrinsic (i.e. related to personal interests of the research) or extrinsic (i.e. related to the interests of those contracting the research). Mahr has outlined the following motives of social research.

Education: To educate and inform the public.

Personal : To promote the academic status of the research

Institutional : To enhance the research quantum of the institutions for which the research works.

Political : To provide support to political plans and programmes.

Tactical : To delay decision or action for as long as the investigation is under way.

1.5 SIGNIFICANCE OF RESEARCH

Significance :"All progress is born of inquiry. Doubt is often better than overconfidence, for it leads to inquiry, and inquiry leads to invention" is a famous Hudson Maxim in context of which the significance of research can well be understood. Increased amounts of research make progress possible. Research inculcates scientific and inductive thinking and it promotes the developments of logical habits of thinking and organisation.

- The role of research in several fields of applied economics, whether related to business or to the economy as a whole, has greatly increased in modern times. The increasingly complex nature of business and government has focused attention on the use of research in solving operational problems. Research, as an aid to economic policy, has gained added importance, both for government and business.

- Research provides the basis for nearly all government policies in our economic system. For instance, government's budgets rest in part on an analysis of the needs and desires of the people and on the availability of revenues to meet these needs. The cost of needs has to be equated to probable revenues and this is a field where research is most needed. Through research we can devise alternative policies and can as well examine the consequences of each of these alternatives. Decision making may not be a part of research, but research certainly facilitates the decisions of the policy makes. Government has also to chalk out programmes for dealing with all facts of the country's existence and most of these will be related directly or indirectly to economic conditions. The plight of cultivators, the problems of big and small business and industry, working conditions, trade union activities, the problems of distribution, even the size and nature of defence services are matters requiring research. Thus research is considered necessary with regard to the allocation of nation's resources. Another area in government, where research is necessary, is collecting information on the economic and social structure of the nation. Such information indicates what is happening in the economy and what

changes are taking place. Collecting such statistical information is by no means a routine talk, but it involves a variety of research problems. These days nearly all governments maintain large staff of research technicians or experts to carry on this work. Thus, in the context of government, research as a tool of economic policy has three distinct phases of operation, viz

(i) Investigation of economic structure through continual compilation of facts.

(ii) diagnosis of events that are taking place and the analysis of the forces underlying them and.

(iii) the prognosis, i.e. the prediction of future developments.

• Research has its special significance in solving various operational and planning problems of business and industry: Operation research and market research, along with motivational research, are considered crucial and their results assist, in more than one way, in taking business decision. Market research is the investigation of the structure and development of a market for the purpose of formulating efficient policies for purchasing, production and sales. Operations research refers to the application of mathematical, logical and analytical techniques to the solution of business problems of cost minimisation or of project maximisation or what can be termed as optimisation problems.

Motivational research of determining why people behave as they do is mainly concerned with market characteristics. In other words, it is concerned with the determination of motivations underlying the consumer behaviour. All these are as great help to people in business and industry who are responsible for taking business decisions. Research with regard to demand and market factors has greatly utility in business. Given knowledge of future demand, it is generally not difficult for a firm or for an industry to adjust its supply schedule with in the limits of its projected capacity. Market analysis has become an integral tool of business policy these days. Business budgeting, which ultimately results in a projected profits and loss account, is based mainly on sales estimates which in turn depends on business research.

Once sales forecasting is done, efficient production and investment programmes can be set up around which are grouped as the purchasing and financing plans.

Research, thus, replaces intuitive business decisions by more logical and scientific decisions.

- Research is equally important for social scientists in studying social relationships and in seeking answers to various social problems. It provides the intellectual satisfaction of knowing a few things just for the sake of knowledge and also has practical utility for the social scientists to know for the sake of being able to do something better or in a more efficient manner. Research in Social Sciences is concerned both with knowledge for its own sake and with knowledge for what it can contribute to practical concerns. "This double emphasis is perhaps especially appropriate in the case of social sciences. On the one hand, its responsibility as a science is to develop a body of principles that makes possible the understanding and prediction of the whole range of human interactions. On the other hand, because of its social orientation, it is increasingly being looked to for practiced guidance in solving immediate problems of human relations.

- In addition to what has been stated above, the significance of research can also be understood keeping in view the following points:

a) To those students who are to write a master's or Ph.D. thesis, research may mean a careerism or a way to attain a high position in the social structure.

b) To professionals in research methodology research may mean a source of livelihood;

c) To Philosophers and thinkers, research may mean the outlet for new ideas and insights.

d) To Literary men and woman, research may mean the development of new styles and creative work.

e) To analysts and intellectual, research may mean the generalisations as new theories.

Thus, research is the foundation of knowledge for the sake of knowledge and an important source of providing guidelines for solving different business, governmental

and social problems. It is a sort of formal training which enables one to understand the new developments in one's field in a better way.

CHECK YOUR PROGRESS 1

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

i) How you define the term Research ?

_____

_____

ii) Give a brief significance of Research ?

_____

_____

1.6 LET US SUM UP

In conclusion we can say that Research aims at discovering the truth. Research is undertaken to discover answers to questions by applying scientific methods with the discovery of new facts, old conclusions or theories, may either be rejected or modified. Research is necessary to examine the extent of the validity of the old conclusions or to find out some new facts and generalisations in connection with the existing one. Thus, it means, Research gives new direction and a new insight into the existing problem.

1.7 SUGGESTED READINGS

P.V. Young, Scientific Social Surveys and Research, Prentice Hall of India, New Delhi, 1975, PP 30–33.

G.A. Lundberg, Social Research Longmans, Green and Co. New York, 1926.

1.8 ANSWER TO CHECK YOUR PROGRESS

i). Research in common parlance refers to search for knowledge. It is also define as a scientific and systematic search for information. The general, it is a scientific art of investigation.

ii) The research is applied in different fields whether it is business or economy. It has a special significance in solving various problems related to industry and business. It can also help ful to social scientifists in solving various societal related problems.

LESSON NO. 2

STEPS IN RESEARCH PROCESS

STRUCTURE

2.1 INTRODUCTION

Many a time we make certain statements which we have not to prove that they are true. They are based either on common sense or on practical observations and experiences on social life, though sometimes they may be based on wisdom too. However, often they are based on ignorance, prejudices and mistaken interpretation. Common sense knowledge, based on the accumulated experiences, prejudices and beliefs of the people, is often contradictory and inconsistent on the other hand, scientific observations are based on verifiable evidence or systematic body of proof that can be cited. For example, some common sense statement may be quoted here: man is more

intelligent than woman, married people remain more happy than single people, high caste people are more talented than low caste people, the rural people are more hard working than urban people, urban people are more BJP-oriented than congress-oriented; and the like. Contrary of this, the scientific research or scientific inquiry finds that woman is as intelligent as man; there is no association between happiness and remaining married or unmarried by a person; caste does not determine individual's efficiency; hard work is not related to environment alone, and urban people are not necessarily BJP-oriented. Thus a statement made on common sense basis may be just a guess, a hunch, or a haphazard way of saying something generally based on ignorance, bias, prejudice or mistaken interpretation, though occasionally it may be wise, true, and a useful bit of knowledge. At one time, common sense statements might have preserved folk wisdom but today, scientific research has become a common way of seeking truths about our social world.

2.2 OBJECTIVES

After reading this Lesson you will be able to

i) Understand various steps of Research Process

2) know examples of Research Problem.

2.3 STEPS IN RESEARCH PROCESS

According to Earl Babbie (The Practice of Social Research) has proposed the following six steps in research process :

a) **Problem or objectivity:** i.e. stating what is to be studied, its worth and practical significance, and its contribution to the construction of social theories.

b) **Literature review :** i.e. what others have said about this topic, what theories have been addressed to it and what are the flaws in the existing research that can be remedied.

c) **Subjects for study :** i.e., from whom is the data to be collected, how to reach persons who are available for study, whether selecting sample will be appropriate, and if yes, how to select this sample and how to insure that research that is being conducted will not harm the respondents.

d) **Measurement :** i.e., determining key variables for the study, how will these variables be defined and measured, how will these definitions and measurements differ from previous researches on the topic.

e) **Data collection methods :** i.e., determining methods to be used for collecting data survey or experiment, etc. statistics to be used or not.

f) **Analysis :** i.e., spell out the logic of analysis whether variations in some quality are to be accounted or not, and the possible explanatory variables to be analysed.

Horton and Hunt have pointed out eight steps in scientific research or scientific method of investigation.

1. **Define the problem,** which is worth studying through the methods of science.
2. **Review of literature,** so that errors of other research scholars may not be repeated.
3. **Formulate the hypothesis,** i.e. propositions which can be tested.
4. **Plan the research design,** i.e. outlining the process as to how, what and where the data is to be collected processed and analysed.
5. **Collect the data,** i.e. actual collection of facts and information in accordance with the research design. Sometimes it may become necessary to change the design to meet some unforeseen difficulty.
6. **Analyse the data,** i.e. classify, tabulate and compare the data, making whatever tests are necessary to get the results.
7. **Draw conclusions,** i.e. whether the original hypothesis is found true or false and is confirmed or rejected, or are the results inconclusive? What has the research added to our knowledge? What implications has it for sociological theory? What new questions have been posed for further research?
8. **Replicate the study :** Though the above-mentioned seven steps complete a single research study but research findings are confirmed by replications. Only

after several researches can the research conclusions be accepted as generally true.

These steps help us in summarizing the so called scientific approach to inquiry.

First, there is doubt whether an indeterminate situation can be made determinate. The scientist experiences vague doubts and is emotionally disturbed. He struggles to formulate the problem, even if inadequately. He studies the literature and scans his own experience and the experiences of others. With the problem formulated, with the basic questions properly asked, he constructs the hypothesis mainly on experimental lines. By collecting the required data, he tests the hypothesis which he may ultimately accept, change, abandon, broaden or narrow down. In this process, sometimes one phase may be expanded, other may be skimmed and there may be fewer or more steps involved. These things are not important. What is important is a controlled rational process of reflective inquiry.

2.4 EXAMPLE OF A RESEARCH PROBLEM INDICATING STEPS:

We may take one example to understand the steps in social research as suggested by various scholars.

As a first step, we need a research problem. Suppose our problem is **"Role Adjustment of working women",** i.e how do working women face conflict between the role of a house holder and that of a wage earner and how do they adjust themselves in family and office? Infact, this problem covers too many aspects. We need a limited and a specific aspect far research. For this we take the aspect of assessing:

"Do working women suffer professionally by not devoting much time to their work? The review of the literature is the second step. It may not provide us much information; yet it is necessary to check whether this theme has been studied by other scholars and what are their findings? One can check from books and journals, including Sociological Abstracts. This search of literature is extremely important.

The Third step is to formulate one or more hypothesis. One might be: "Married working women get less promotions than single (unmarried divorce) working women". Other might be, "The reputation of childless married women of being dedicated and committed workers is much higher than women with two or more children".

Planning research design is the fourth step. All categories must be designed and the variables to be controlled must be decided. We must be sure that the two groups we compare are similar in all important respects except marital status or number of children. We must select sources of data, and procedures for collecting and processing them. One possibility is that the research is confined to female lecturers in a university, the other possibility is to study female clerks in some office and so forth.

- The fifth step is actual collection of data and classifying and processing it. In this age of research, the data are generally made "computer sensible". The computer gives the desired computations and comparisons including data for statistical tests.

  The sixth step is to analyse data for finding out contrast between the two groups. In this process, sometimes unexpectedly, even some additional hypotheses may be developed.

- The seventh step is drawing conclusions wether our hypothesis is true or false? What further study is suggested by our research ?

  Finally, other researchers will undertake replication studies.

The basic procedure is the same for all scientific inquiries and researches. Only techniques may vary according to the problem under study. However, one thing that needs to be remembered is that hypotheses are not involved in all researches. Some researches may only collect the data and develop hypothesis from the analysis of data. Thus, "anything involving careful objective collecting of verifiable evidence in search for knowledge is scientific research".

CHECK YOUR PROGRESS 1

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

i) Explain various steps in Research Process ?

_____

_____

2.5 LET US SUM UP

In conclusion we can say that Research aims at discovering the truth. Research is undertaken to discover answers to questions by applying scientific methods with the discovery of new facts, old conclusions or theories, may either be rejected or modified. Research is necessary to examine the extent of the validity of the old conclusions or to find out some new facts and generalisations in connection with the existing one. Thus, it means, Research gives new direction and a new insight into the existing problem.

2.6 SUGGESTED READINGS

P.V. Young, Scientific Social Surveys and Research, Prentice Hall of India, New Delhi, 1975, PP 30–33.

G.A. Lundberg, Social Research Longmans, Green and Co. New York, 1926.

2.7 ANSWER TO CHECK YOUR PROGRESS

i). Problem or objectivity.

ii) Literature Review

iii) Subjects for Study

iv) Measurement

v) Data Collection Methods

vi) Analysis

HYPOTHESIS

STRUCTURE

3.1 INTRODUCTION

After operationalising the variables, the researcher wants a clear framework and guide for collecting and interpreting the data. His interest is to determine relationships between variables. Hypothesis provide such guidance. While in qualitative research, hypothesis emerge out of the research, in quantitative research, hypothesis act as a step towards research.

Hypothesis is usually considered as the principal instrument in research. Its main function is to suggest new experiments and observations. In fact, many experiments are carried out with the deliberate object of testing hypothesis. Decision makers often face situations where in they are interested in testing hypothesis on the basis of available information and then take decisions on the basis of such testing.

3.2 OBJECTIVES

This unit aims at presenting the meaning and explanation of Research hypothesis. After reading this unit you will be able to understand

- Meaning of hypothesis
- Different definitions of hypothesis.
- Procedure for constructing hypothesis.
- Different sources of hypothesis.
- Types, Functions and importance of hypothesis.

3.3 MEANING/DEFINITIONS

Ordinarily, when one talks about hypothesis, one simply means a mere assumption or some supposition to be proved or disapproved. But for a researcher hypothesis is a formal question that he intends to resolve.

Thus a hypothesis may be defined as a proposition or a set of propositions set forth as an explanation for the occurrence of some specified group of phenomena either asserted merely as a provisional conjecture to guide some investigation or accepted as highly probable in the light of establish facts. Quite often a research hypothesis is a predictive statement, capable of being tested by scientific methods, that relates an independent variable to some dependent variable. For example, consider statements like the following ones:

"Students who receive counselling will show a greater increase in creativity than students not receiving counselling".

"The automobile A is performing as well as automobile B".

These are hypotheses capable of being objectively verified and tested. Thus, we may conclude that a hypothesis state what we are looking for and it is a proposition which can be put to a test to determine its validity.

According to Theodorson and Theodorson "a hypothesis is a tentature statement asserting a relationship between certain facts".

Kerlinger describes it as "a conjectural statement of the relationship between two or more variables".

Webster has defined hypothesis as, "a tentature assumption made in order to draw out and test its logical or empirical consequences". 'Test' here means either to prove it wrong or to confirm it. Since statements in hypothesis have to be put to empirical investigation, the definition of hypothesis excludes all statements which are merely opinions (e.g., aging increases ailments), value judgements (e.g., contemporary politicians are corrupt and have a vested interests to serve) or normative (e.g., all people should go for a morning walk).

Normative statement is a statement of what ought to be not a factual statement that can be shown through investigation to be right or wrong.

3.4 SOURCES OF HYPOTHESIS

Available Literature is considered as the major source of hypothesis. While reviewing the literature a research comes across various theories and assumptions. These theories and assumptions form the basis of various hypothesis. Personal experiences, the socialization process and learning experiences are some other sources of hypothesis. On the basis of personal experience a researcher may be able to generate hypothesis. Many a times, views peculiar to persons and causal observations help a researcher to formulate hypothesis.

Finding of other study are often a source of valuable hypothesis. A researcher on the basis of the findings of other studies, may hypothesize that the similar causal relationship between a set up variables will hold good in his present study too.

Theories are infact, a seed-bed of hypothesis. Many hypothesis stem from a body of theory which is the outcome of logical deductions of theories. Theories represents what are known. A logical deduction from these theories must be true if the

theories are true.

3.5 CRITERION FOR HYPOTHESIS CONSTRUCTION

Hypothesis is never formulated in the form of a question. Bailey Becker and Sarantakos have pointed out a number of standards to be met in formulating a hypothesis.

1. It should be empirically testable, whether it is right or wrong.
2. It should be specific and precise.
3. The statements in the hypothesis should not be contradictory.
4. It should specify variables between which the relationship is to be established.
5. It should describe one issue only.

A hypothesis can be formed either in descriptive or relational form. In the former it describes events where as in the latter it establishes relations between variables. A hypothesis can also be formed in the directional, non-directional or null-form.

3.6 CHARACTERISTICS OF HYPOTHESIS

1. **Hypothesis should be clear and precise**: If the hypothesis is not clear and precise, the inferences drawn on its basis cannot be taken as reliable.
2. **Hypothesis should be capable of being tested:** In a swamp of untestable hypothesis, many a time the research programmes are bogged down. Some prior study may be done by researcher in order to make hypothesis a testable one. A hypothesis is testable if other deductions can be made from it which in turn, can be confirmed or disapproved by observation.
3. Hypothesis should state relationship between variables, if it happens to be a relational hypothesis.
4. Hypothesis should be limited in scope and must be specific.
5. Hypothesis should be stated as far as possible in most simple words, so that the term is easily understandable by all concerned.

6. Hypothesis should be consistent with most known facts i.e. it must be consistent with a substantial body of established facts. In other words it should be one, which judges accept as being the most likely.

7. Hypothesis should be amenable to testing within a reasonable time. One should not use even an excellent hypothesis, if the same cannot be tested in reasonable time for one cannot spend a life time collecting data to test it.

8. Hypothesis must explain the facts that gave rise to the need for explanation. This means that by using the hypothesis plus other known and accepted generalisations, one should be able to deduce the original problem/condition. Thus hypothesis must actually explain what it intends to explain, it should have empirical reference.

3.7 TYPES OF HYPOTHESIS

Hypothesis are classified as working hypothesis, research hypothesis, null hypothesis, statistical hypothesis, alternative hypothesis and scientific hypothesis.

1. **Working hypothesis:** is a preliminary assumption of the researcher about the research topic, particularly when sufficient information is not available to establish a hypothesis, and as a step towards formulating the final research hypothesis. Working hypothesis are used to design the final research plan, to place the research problem in its right context and to reduce the research topic to an acceptable size e.g., in the field of business administration, a researcher can formulate a working hypothesis that assuring bonus increases the sales of a commodity. Later on, by collecting some preliminary data, he modifies this hypothesis and takes a research hypothesis that assuring lucrative bonus increases the sale of a commodity.

2. **Scientific hypothesis-** it contains statement based on or derived from sufficient theoretical and empirical data.

3. **Alternative hypothesis:** It is a set of two hypothesis (research and null) which states the opposite of the null hypothesis. In statistical tests of null hypothesis, acceptance of HO (null hypothesis) means rejection of the alternative hypothesis, and rejection of HO means acceptance of the alternative hypothesis.

4. **Research hypothesis:** is a researchers proposition about some social fact without reference to its particular attributes. Researcher believes that it is true and wants, to approve it, e.g. Muslims have more children than Hindus, or drug abuse is found more among upper-class students living in hostels or rented rooms. Research hypothesis may be derived from theories or may result in developing theories.

5. **Null hypothesis:** It is reverse of research hypothesis. It is a hypothesis of no relationship. Null hypothesis don't exist in reality but are used to test research hypothesis.

6. **Statistical hypothesis:** According to Winter, it is a statement/observation about statistical populations that one seeks to support or repute. The things are reduced to numerical quantities and decisions are made about these quantities, e.g. income difference between two groups: group A is richer than group B. Null hypothesis will be : group A is not richer than group B. Here, variables are reduce to measurable quantities.

3.8 FUNCTIONS OR IMPORTANCE OF HYPOTHESIS

• Sarantakos has pointed out following three functions of hypothesis.

1 to guide social research by offering directions to the structure and operations.

2. to offer a temporary answer to the research question, and

3 to facilitate statistical analysis of variables in the context of hypothesis testing.

The importance of hypothesis can also be pointed out in following terms:

1 Hypothesis are important as tools of scientific inquiry/research because they are derived from theory or lead to theory. The relationship expressed in the hypothesis tells the researcher how to conduct inquiry, what types of data need to be collected and how are the data to be analysed. Suppose we take three hypothesis: H_1, H_2 and H_3. We say, if H_1 is true, H_2 will also be true but H_3 will not be true. Then, we test H_2 and H_3. If H_2 is found true and H_3 not true, H_1 will be confirmed.

2. The facts (in hypothesis) get a chance to establish the probable truth or falsify it. A problem really cannot be scientifically solved if it is not reduced to hypothesis form because a problem is a question of a broad nature and in itself, not directly

testable. One does not test the questions but one tests relationship between two variables.

3. Hypothesis are tools for the advancement of knowledge as they stand apart from man's values and opinions.

4. Hypothesis help the social scientists to suggest a theory that may explain and predict events. Though more often research proceeds from theories to hypothesis occasionally the reverse is true.

5. Hypothesis perform a descriptive function. The tested hypothesis tells us something about the phenomenon it is associated with. The accumulation of information of a result of hypothesis testing reduces the amount of ignorance we may have about why a social events occurs a given way.

CHECK YOUR PROGRESS

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

i) How you define the term Research ?

_____

_____

ii) Give a brief significance of Research ?

_____

_____

3.9 LET US SUM UP

A hypothesis is indispensable for any scientific investigation. The hypothesis always guides and gives direction to the scientific investigation. Without a hypothesis, a scientist cannot know as to what to observe and how to observe. Without a hypothesis, an investigation becomes unfocused, The scientist in that case has to beat about the bush. According to Northrop, 'The function of a hypothesis is to direct our search for order among facts, the suggestions formulated in any hypothesis may be solution to the problem.

Whether they are, is the task of the enquiry'.

3.10 SUGGESTED READINGS

- Bailey, Kenneth D., Methods of Social Research (2nd ed.), The Free Press, New York, 1982.
- Sarantakos, S., Social Research (2nd ed.), Macmillan Press, London, 1998.
- Goode, W.J and P.K. Hatt, Methods in Social Research, MC-Graw-Hill, New York, 1952.

3.11 ANSWERS TO CHECK YOUR PROGRESS

i) Hypothesis is defined as a proposition or set of proposition set forth as an explanation for the occurence of some specified group of phenomena.

ii) The Hypothesis always guide and gives direction to the scientific investigation. Without hypothesis, an investingation becomes unfocused.

CONCEPT OF OBJECTIVITY

STRUCTURE

4.1 INTRODUCTION

Objectivity is a central philosophical concept, related to reality and truth, which has been variously defined by sources. Generally, objectivity means the state or quality of being true even outside a subject's individual biases, interpretations, feelings and imaginings. A proposition is generally considered objectively true (to have objective truth) when its truth conditions are met without biases caused by feelings, ideas, opinions, etc. of a sentient subject. A second, broder meaning of the term refers to the ability in any context to judge fairly, without partiality or external influence. This second meaning of objectivity is sometimes used synonymously with neutrality.

4.2 OBJECTIVES

The main thrust of this unit is to :

- To understand the meaning of Objectivity
- To know about the relevance objectivity in the research process
- To get knowledge about the views of social scientists on objectivity

4.3 OBJECTIVISM

"Objectivism" is a branch of philosophy that orginated in the early nineteenth century. Gottlob Frege was the first to apply it, when he expounded an epistemological and metaphysical theory contrary to that of Immanuel Kant. Kant's rationalism attempted to reconcile the failure he perceived in philosophical realism. Stronger versions of this claim hold that there is only one correct description of this reality. If it is true that reality is mind-independent, then reality might include objects that are unknown to consciousness and thus might include objects not the subject of intentionality. Objectivity in referring requires a definition of truth. According to metaphysical objectivists, an object may truthfully be said to have this or that attribute, as in the statement "This object exists", wheras the statement "This object is true" and "Objectivism" are not synonymous, with objectivism being an ontological theory that incorporates a commitment to the objectivity of objects.

Plato's idealism was a form of metaphysical objectivism, holding that the Ideas exist objectively and independently. Berkeley's empiricist idealism, on the other hand, could be called a subjectivism: he held that things only exist to the extent that they are perceived. Both theories claim methods of objectivity. Plato's definition of objectivity can be found in his epistemology, which takes as a model mathematics, and his metaphysics, where knowledge of the ontological status of objects and ideas is resistant to change.

Plato considered knowledge of geometry a condition of philosophical knowledge, both being concerned with universal truths. Plato's opposition between

objective knowledge and *doxa* (opinons) became the basis for later philosophies intent on resolving the problem of reality, knowledge and human existence. Personal opinions belong to the changing sphere of the sensible, opposed to a fixed and eternal incorporeal realm that is mutually intelligible.

Where Plato distinguishes between what and how we know things (epistemology), and their ontological status as things (metaphysics), subjectivism such as Berkeley's and a mind dependence of knowledge and reality fails to distinguish between what one knows and what is to be known, or at least explains the distinction superfically. In Platonic terms, a criticism of subjectivism is that it is difficult to distinguish between knowledge, *doxa*, and subjective knowledge (true belief), distincitions that Plato makes.

The importance of perception in evaluating and understanding objective reality is debated. Realists argue that perception is key in directly observing objective reality, while instrumentalists hold that perception is not necessarily useful in directly observing objective reality, but is useful in interpreting and predicting reality. The concept that encopasses these ideas is important in the philosphy of science.

4.4 OBJECTIVITY IN SOCIAL SCIENCE RESEARCH

Objectivity is considered as an ideal for scientific inquiry, as a good reason for valuing scientific knowledge, and as the foundation of the authority of science in society. It expresses the thought that the claims, methods and results of science are not, or should not be influenced by particular perspectives, value commitments, community bias or personal interests, to name a few significant factors. Scientific objectivity is a feature of scientific claims, methods and results. On doing literature review to understand the importance of objectivity in social sciences, many central debates emerged in the philosophy of science, in one way or another, to do with objectivbity like evidence-based science, confirmation and the problem of induction, evidence and the foundations of statistics, feminism and values in science, theory choice and scientific change, scientific explanation; experimentation; measurement and quantification etc; hence, understanding the role of objectivity in social science is therefore integral to a full appreciation of above debaes. Many social scientists like

Durkheim, Max Weber, Radeliff Brown, Malinowski, Gunnar Myrdal, and Lionel Robbins emphasized on objectivity.

The ethos of social science proclaimed Myrdal in the opening of his (1969) "Objectivity in Social Research" is the search for objective truth. Does the search for objective reality still lie at the core of transformation in research conduct as a result of its marketisation calls for a clarification of the content and acknowledgement that a vast body of social knowledge is necessarily normative or value-laden and be reconciled with objectivity ? Myrdal calls 'beliefs valuations in relation to the quest for objectivity in social research. He raises a number of fundamental questions o the compatibility of objective and subjective knowledge whose wider implications have been explored by several modern philosophers. Two views of Gunnar Myrdal are as follows :

i) A researcher who takes on real issues necessarily makes many deep judgments about what is important, what evidence and arguments deserve attention, what formulations illuminate the issue, and so on. These judgments reflect his moral and ideological sensibilities.

ii) As social researchers, one has to acknowledge the Gunnar Myrdal philosophy of objectivity as our best hope of bridging the sensibilities and of refining and better justifying our own and respecting those with differing sensibilities. When ideological sensibilities are kept in the dark, it is more likely that ideological commitments warp discourse.

4.5 OBSTACLES TO OBJECTIVITY IN THE SOCIAL SCIENCES

There are obstacles to objectivity common to all sciences. The obstacles special to the social sciences are caused by the special involvement of the investigator with his topic of study, which relats to both his interests and his emotional make-up. Even though achieving complete objectivity in science is an impossiblity, aiming at it, or attaining as much of it as reasonably possible, is a necessary condition for the conduct of all scientific inquiry. The fact, that values of the individual researchers are heir to some intellectual preferences, judgments and standpoints. The individual researcher may also heir to a social and cultural tradition as a result of his being a member of a specific group of national, religous and ethnic characteristics. For example, a social

anthropologist may easily tend to evaluate and judge the practices and mores of people belonging to alien cultures in terms of his own. This is the well-known danger of ethnocentricity, so-called. There is no inherent difference between ethnic and class centricity. The investigator's individual experience may result in either negative or positive dispositions towards all sorts of groupings of people. He may identify with a group of people, which seem to him to resemble his own group or, on the contrary, especially free of his own people's shortcomings to which he is most sensitive. As every individual possesses layers and patchworks of values, acquired from different social milieus and during different phases of his development;

They may easily be inconsistent and ambivalent and ambiguous. For example: only women can understant women's problems is one of the ideologies. Each individual investigator should make the effort to become aware, as much as he reasonably can, of those of his value judgments that are relevant to his studies. This is no easy task, as we let sleeping subconscious motivations lie. It does not mean to say that the individual investigator should be an aseptic or neutral or disinterested party or that he should lack social concern, but researcher should try to be conscious and critical of his interets and preferences; which includes his being conscious of those moral options he takes which he does not subject to rational examination. Even in pluralist societies, politico-ideological convictions play a considreable role in distorting social realities. It is a usual that personal economic self-interest or the economic interest of the scientist's group may bias his judgment. Resolving Obstacles to Objectivity viewing inquiry as subjective, or as a wholly individual matter, would lead to the exclusion of all criticism; and this would be the exclusion of rational debate; and this would be the denial of the thesis of the intellectual or rational unity of mankind. It thus opens the door to irrationalism and elitism, whether social or racial. Biases in social science cannot be erased simply by 'keeping to the facts' and refining the methods of dealing with statistical data. Indeed, data and the handling of data are often more susceptible to tendencies towards bias than is 'pure thought'. The chaos of possible data for research does not systematize itself into systematic knowledge by mere observation if, researchers in their attempts to be factual, researchers do not make their viewpoint explicit, they leave room for biases.

4.6 PROBLEMS OF OBJECTIVITY

Objectivity is a goal of scientific investigation. Sociology also being a science aspires for the goal objectivity. Objectivity is a frame of mind so that personal prejudices, preferences or predilections of the social scientifists do not contaminate the collection of analysis of data. Thus scientific investigations should be free from prejudices of race, color, religion, sex or ideological biases.

The need of objectivity in sociological research has been emphasized by all important sociologists. For example Durkheim in the Rules of the Sociological Method stated that social facts must be treated as things and all preconceived notions about social facts must be abandoned. Even Max Weber emphasized the need of objectivity when he said that sociology must be value free. According to Radeliff Brown the social scientist must abandon or transcend his ethnocentric and egocentric biases while carrying out researches. Similarly Malinowski advocated cultural relativism while anthropological field work in order to ensure objectivity.

However objectivity continues to be an elusive goal at the practical level. In fact one school of thought represented by Gunnar Myrdal states that total objectivity is an illusion which can never to achieved. Because all research is guided by certain viewpoints and viewpoints involve subjectivity. Myrdal suggested that the basic viewpoints should be made clear. Further he felt that subjectivity creeps in at various stages in the course of sociological research. Merton believes that the very choice of topic is influenced by personal preferences and idological biases of the reseearcher.

CHECK YOUR PROGRESS

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

i) What is meant by the term objectivity :

_____

_____

ii) Discuss in brief the problems of objectivity ?

_____

_____

4.7 LET US SUM UP

The only way in which we can strive for 'objectivity' in theoretical analysis is to expose the valuations to full light, make them conscious, specific and explicit, and permit them to determine the theoretical research. A more balanced view of objectivity both as a method as well as ideal must be considered. Thus complete objectivity continues to be an elusive goal. The researcher shold make his value preference clear in research monograph. Highly trained and skilled research workers shold be employed. Various methods of data collection research should be used and the result obtained from one should be cross-checked with those from the other. Field limitations must be clearly stated in the reseach monograph.

4.8 SUGGESTED READINGS

1. Ahuja, Ram (2009) Research Methods. Rawat Publication. Jaipur.

2. Kothari, C. R. (2004) Research Methodology : Mthods and Techniques International Publishers. New Age.

4.9 ANSWERS TO CHECK YOUR PROGRESS

i) Objectivity means the state or quality being true even outside a subject's individual biasis, inter pretations, feeling and imaginings.

ii) Personal prejudices, preferences or prelidictions are some of the problems of objectivity.

METHODOLOGY

STRUCTURE

5.1 INTRODUCTION

This chapter deals with explaining the methodology of social science research, Philosophical background of research. Research Methodology lis a way to systematically solve the research problem. It may be understood as a science of studying

how research is done scientifically. The researcher needs to know how to develop certain induces or tests, how to perform statistical operations such as averages, standard deviation, inferential statistics like chi-square or which research technique to apply, but also to know which techniques are relevant and then what would they mean. The scope of research methodology is wider than of research methods.

5.2 OBJECTIVES

After reading this lesson you will be able to Understand :-

i) Meaning of Research Methodology

ii) Basic elements of Research Methodology.

iii) Types of Scientific Methods

5.3 METHODOLOGY

A set of system of methods, principles and rules for regulating a given discipline. Unlike method (which systematically details a given procedure or process) does not describe specific methods. Methodology refers to the rationale and / or the philosophical assumptions that underlie a particular study or a particular methodology. Research methodology refers to a philosophical background of research.

5.4 RESEARCH METHODOLOGY

It is a science of studying how research is done scientifically. It is a way to systematically solve the research problem by logically adopting various steps. Methodology helps to understand not only the products of scientific inquiry but the process itself. It aims to describe. and analyze methods, throw light on their limitations and resources, clarify their presupposition and consequences, relating their potentialities to the twilight zone at the frontier of knowledge. .

During the 19th century philosophers and other advocated the scientific study of human society. It was during that time many thinkers developed theories about society, followed later by methodologies for testing theories and developing new ones. Theory and methodology go hand in hand when studying pattern of life in human society. The 19th century French Philosopher Auguste Comte was an important early figure in the development

of social science theories. He believed that society could be studied scientifically and objectively at a time when most societal changes were explained in religious terms.

5.5 PHILOSOPHY BEHIND METHODOLOGY: - Historical Perspective

When most people think about science they visualize laboratory and chemicals. They think of science as bring, cut and dry and then think of scientist as narrow of this world of reality 'a nerd'. A lot of our stereotypes about science came from a particular period when science was dominated by positivism. Positivism in its broadest sense is a rejection of metaphysics. It holds that the goal of knowledge is simply to describe the phenomenon that we experience. The process of science is to stick to what we can observe or measure. They minded and out believed that anything that cannot be measured is not science. Science was seen as the way to get to the truth well enough to predict or control it. the positivists believed in empiricism. The key approach to scientific method is experiments; attempt to discern natural laws through direct manipulation and observation.

Things changed in middle part of the 20th century, with a shift to post positivism. A positivism might begin by recognizing that the way scientists think and work and the way we think in our everyday life are not distinctly different. Post positivist recognizes that all observation is fallible and has error and that all theory is reversible. Post positivist emphasizes the importance of multiple measurement and observation, the need to use 'triangulation'. Most **post positivist are constructivists** who believe **that** each person constructs reality from own perspective. They believe that the best approach to objectivity is 'triangulation' across various perspectives. The scientific methodology is based on this conceptual frame work.

Two Schools of Science

Approach	Concepts	Methods
Positivism testing	Social Structure Social facts	Quantitative Hypothesis
Interpretive Science	Social Construction meanings	Quantitative Hypothesis

generation

(Phenomenological)

(Post positivist)

5.6 BASIC ELEMENTS OF SCIENTIFIC RESEARCH METHODOLOGY

Laws	Verified hypotheses, used to assets a predictable association among variables, can be empirical or theoretical.
Principles	It is a law or general truth which provides a guide to thought or action.
Hypotheses	Formal propositions which, though untested, are amenable to testing usually expressed in casual terms.
Conjectures	Informal proposition which are not stated in a testable form, nor is casual relationship known or even necessarily implied.
Concepts	Concepts are inventions of the human minded to provide a mean for organization and understanding observation; they perform a number of functions.
Construct	which are designed to form logical and systematic relationship among data.
Data	The collection of facts achieved either through direct observation or through gaining records; observation is the process by which facts became data.

Reseach tactics and their philosophical bases :

Research approaches	**Positivistic**	
Phenomenological		
	(Qantitative)	(Quantitative)
Action research		Strictly interpretive
Case studies	Have scope to be either	
Ethnographic		Strictly interpretive

Field experiments	Have scope to be either	
Focus groups		Mostly interpretive
Forecasting research	Strictly positivism with Some room for Interpretation	
Futures research	Have scope to be either	
Game or role playing		Strictly interpretive
In depth survey		Mostly interpretive
Laboratory experiments	Strictly positivism with Some room for Interpretation	
Participant observation		Strictly interpretive
Scenario research		Mostly interpretive

Research approaches :-

Two basic approaches to research :

1. Quantitative approach
2. Qualitative approach

1. Quantitative approach : It involves generation of data in quantitative form, i.e. in numbers, which can be subjected to rigorous quantitative analysis in a formal and rigid manner. This approach can be further subdivided into:

i) Inferential :- To form data base from which to infer characteristics or relationship of population.

ii) Experimental :- Having greater control over the research environment and in this case same variables are manipulated to observe effect on some other variables.

iii) Simulation :- It involves construction of an artificial environment within which relevant data can be generated.

2. Qualitative approach : is a research concerned with subjective assessment of attitudes, opinion and behaviour.

5.7 METHODS AND TOOLS

Method is a tool or an instrument employed to gather empirical evidence and to analyse data. It is building of scientific knowledge. In scientific method, knowledge is built through observation, experimentation, generalisation and verification. The scientific Method is based on the assumption that knowledge is based on what is experienced through the senses and that the statement to be accepted as true and meaningful if it is empirically verifiable.

According to Sarantakos, the content, structure and processes of methods are dictated by the underlying methodology. For instance, observation as a method of data collection is used both in qualitative and quantitative research but participant observation is more used in qualitative studies while non-participant observation is employed in quantitative studies. Similarly in interview method, unstructured interview is used more in qualitative studies and structured interview in quantitative studies. Methods are not used for determining the type as methodology without considering factors relating to its purpose, process, type of analysis and other factors.

In other words, all those methods which are used by the researcher during the course of studying his research problem are termed as research methods. Since the object of research, particularly the applied research, is to arrive at a solution for a given problem, the available data and the unknown aspects of the problem have to be related to each other to make a solution possible. Keeping this in view, research method can be put in the following three groups:-

1. In the first group we include those methods which are concerned with the collection of data. These methods are used where the data already available are not sufficient to arrive at the required solution.
2. The second group consists of those statistical techniques which are used for establishing relationships between the data and the unknowns;
3. The third group consists of those methods which are used to evaluate the accuracy of the results obtained.

Research methods falling in the above stated last two groups are generally taken as the analytical tools of research.

5.8 RESEARCH AND SCIENTIFIC METHOD

For a clear perception of the term research, one should know the meaning of scientific method. The two terms, research and scientific method, are closely related. Research, can be termed as "an inquiry into the nature of the reasons for, and the consequences of any particular set of circumstances, whether these circumstances are experimentally controlled or recorded just as they occur. Further, research implies that the researcher is interested in more than particular results; he is interested in the repeatability of the results and in their extension to more complicated and general situations".

On the other hand, the philosophy common to all research methods and techniques, although they may vary considerably from one science to another is usually given the name of scientific method. In this context, Karl Pearson writes, "The Scientific method is one and the same in the branches and that method is the method of logically trained minds. The unity of all sciences consists alone in its methods, not in its material, the man who classifies facts of any kind whatever, who sees their mutual relation and describes their sequences, is applying the scientific method and is a man of science".

Scientific Method is the pursuit of truth as determined by logical considerations. The ideal of science is to achieve a systematic interaction of facts. Scientific Method attempts to achieve "this idea by experimentation, observation, logical arguments from accepted postulates and a combination of these three in varying proportions". In scientific method, logic aids in formulating propositions explicitly and accurately so that their possible alteratives become clear. Further, logic develops the consequences of such alternatives, and when these are compared with absorbable phenomena, it becomes possible for the researcher or the scientist to state which alternative is most in harmony with the observed facts. All this is done through experimentation and survey investigations which constitute the integral parts of scientific method.

Experimentation is done to test hypothesis and to discover new relationships,

if any among variables. But the conclusion drawn on the basis of experimental data are generally criticized for either faulty assumptions, poorly designed experiments, badly executed experiments or faulty interpretations. As such the researcher must pay all possible attention while developing the experimental design and must state only probable inferences. The purpose of survey investigations may also be to provide scientifically gathered information to work as a basis for the researchers for their conclusion.

5.9 TYPES OF SCIENTIFIC METHODS

Broadly speaking, there are several methods of conducting a scientific research in sociology.

These are :

(1) Field study method
(2) Experimental method
(3) Survey method
(4) Case study method
(5) Statistical method
(6) Historical Method and
(7) Evolutionary method

1. Field study method : In which subjects are observed under their usual environmental conditions of life rather than under laboratory conditions. The subject may or may not be aware of being observed often interviews are used in this method.

2. Experimental method : In which variables being studied are consulted by the investigator. In other words, the effect of one variable is observed while other relevant variables are held constant.

3. Survey method : In which systematic study of a particular community or a group as an institution is made for analysing the problem/ issue/event.

4. Case study method : In which phenomenon is studied through /intensive/in-

depth analysis of the cases; i.e., an individual group, community, episode or any other unit of social life variety of facts are related to a single case.

5. Statistical method : In which data is collected quantitatively as by statistics. A statistics may be a measure of central tendency of dispersion of correlation of a difference between two samples.

6. Historical method : In which information is collected about the past from written records of all types/ reports, documents, newspapers, diaries, etc.

7. Evolutionary method : In which change is studied in stages through time from earlier and generally simple forms through a long series of small changes. Each change results in minor modification but the cumulative effect of money changes over a long period of time in the emergence of more complex forms

5.10 RESEARCH METHODS V S RESEARCH METHODOLOGY

Research methods may be under stood as all those methods / techniques that are used for conducting research. All those methods which are used by the researcher during the course of studying his research problem are research methods. These can be grouped as :-

1. Those concern with the collection of data.
2. Statistical techniques which are used for establishing relationship.
3. Method which are used to evaluate the accuracy of the results obtained.

Last two methods are taken as analytic tools.

Research Methodology:- It is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. The researcher needs to know how to develop certain induces or tests, how to perform statistical operations such as averages, standard deviation, inferential statistics like chi-square or which research technique to apply, but also to know which techniques are relevant and then what would they mean. The scope of research methodology is wider than of research methods.

When we talk of research methodology we not only talk of research methods, but also consider the logic behind the methods we use in context of our research study

and explain why we are using a particular method or technique, so that the results are capable of being evaluated by self or others

Check Your Progress 1

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

i) What is meant by Research Methodology ?

_____

_____

ii) Discuss basic elements of Research Methodology ?

_____

_____

5.11 LET SUM UP

In short we can say that it is a science of studying how research is done scientifically. It is a way to systematically solve the research problem by logically adopting various steps. When we talk of research methodology we not only talk of research methods, but also consider the logic behind the methods we use in context of our research study and explain why we are using a particular method or technique, so that the results are capable of being evaluated by self or others.

5.12 SUGGESTED READINGS

Ahuja, Ram (2009) Research methods Rawat Publications, Sat yam apartments, Sector-3, Jawahar Nagar, Jaipur.

Kerlinger, Fredn (1983) Foundation of Behavioural Research, (2nd Edition).

Surjeet Publications, 7-K, Kolhapur Road, Kamla Nagar, Delhi.

Kothari, C.R (2004) Research Methodology Methods And Techniques (2nd Revised Edition), New Age International Publishers.

5.13 ANSWERS TO CHECK YOUR PROGRESS

i) It is science of studying how research is done scientifically.

ii) The various elements of Reserach Methodology are follows :

Laws, Principles, Hypothesis, Concepts, Construct and Data etc.

BASIC AND APPLIED RESEARCH

STRUCTURE

6.1 INTRODUCTION

Research in common parlance refers to a 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. The advanced Learner's Dictionary of current English lays down the meaning of research as a "careful investigation or inquiry specially through search for new facts in any branch of knowledge" Redman and Mory define research as a "systematized effort to gain new knowledge". Some people consider research as a movement, a movement from the known to the unknown. It is actually voyage of discover we all posses the vital instinct of inquisitiveness for, when the unknown confronts us; we wonder and our inquisitiveness makes us probe and attain full and fuller understanding of the unknown. This inquisitiveness is the mother of all knowledge and the method, which man employs

for obtaining the knowledge of whatever the unknown, can be termed as research. Research can either be basic or applied research.

6.2 OBJECTIVES

This unit aims at presenting the explanation of basic and applied research:

After reading this unit you will be able to understand :

- Meaning of Basic and applied research.
- Interdependence between basic and applied research.
- Importance of basic and applied research in social world.

6.3 MEANING OF BASIC RESEARCH

This aims at primarily obtaining theoretical knowledge and the logical process involved in the phenomenon. It pursues knowledge for the sake of knowledge itself. In such an inquiry, many assumptions are to be made, and some fundamental principles are to be involved. It is more after than not an intellectual exercise aimed at finding some theoretical conclusions. Such a research may verify the old theory as establish a new one. Fundamental research is essentially positive and not normative. That is to say, it explains the phenomena as they are and not as they should be, e.g., Developing a theory pertaining to the functioning of group mind collective behaviour or group dynamics. This type of research is also used to reject or support the existing theories about social phenomena.

Similarly, research studies, concerning human behaviour carried on with a view to make generalisations about human behaviour, are also examples of Basic/ fundamental research.

6.4 MEANING OF APPLIED RESEARCH

This research is concerned with search for ways of using scientific knowledge to solve practical problems. It focuses on analysing and solving social and real-life problems. The findings become basis of framing programmes and policies, based on principles of pure research. According to Horton and Hunt, this research is an investigation for ways of using scientific knowledge to solve

practical problems. Because this research is generally conducted on large/scale basis, it is expensive as such, it is often conducted with the support of some financing agency like government, public corporation, world Bank, UNICEF, UGC, ICSSR, etc. Many a time, this type of Research is conducted on interdisciplinary basis also.

A sociologist who seek to find out why crime is committed or how a person becomes a criminal is working for a pure research. If this sociologist then tries to find out how a criminal can be rehabilitated of his deviant behaviour can be controlled is doing/applied research. A sociologist making a study of nature and extent of drug abuse among truck and auto rickshaw driver or among industrial workers is working for pure research. If this is followed by a study of how to reduce drug abuse among these people, it will be applied research. Thus practical application of sociological knowledge is becoming common as it is believed that on many social questions, there is considerable scientific knowledge with the social sciences.

6.5 INTERPLAY BETWEEN APPLIED AND PURE RESEARCH

Sociology is still in an early phase of growth, and its frame of reference is not much more abstract than that of common sense. It should follow, then, that practical problems can contribute to theoretical sociology, and vice versa. At the present time, it is wasteful to lose the theoretical knowledge that could be gained from well designed applied research. Yet it should be possible to utilize in a practical fashion the discoveries of theoretical sociology. Let us sketch some of the possible interplay between these two.

A FROM THE SIDE OF APPLIED RESEARCH:

1. Applied Research can contribute new facts:

Much of science consists in simply finding out what the facts are within a rather broad definition of relevance. Before we can organize a study that will neatly test a hypothesis, a considerable amount of information is necessary. If we had to develop all this information for each study, scientific work would be impossible.

We may need census reports, tabulations from divorce courts, descriptions of forming patterns, diagrams of the structure of a corporation, and so on. Such data are useful for subsequent analysis, for solving practical problems, or for setting up new tests.

2. Applied Research can put theory to the test:

The reader of the research reports has become somewhat more sophisticated then he once was he is no longer willing to accept the facile statements of a social observer. He wishes to know instead when it was seen under what conditions, far how many people of what kinds and so on. Since practical social problems are almost invariably studied in an atmosphere of political conflict, the resulting report must be technically acceptable. The study must follow scientific procedures, for it may have to face the criticism of partisan groups. For this reason a relatively formalised research design must be worked out and applied. The researcher must be conscious of what he proposes to do and of why he uses certain techniques. Thus he is able to justify the cost of the research to the sponsoring agency or foundation and to defend his results later.

A practical research study thus provides an excellent opportunity to put theory to test. It attempts to diagnosis of a situation and a solution. Pure Sociologists are wresting with logically similar questions, often about the same subject matter. From his knowledge of theory, the Sociologists should be able develop hypothesis which predict what he will find in the study. The demand for formulized procedures requires that he sharpen his concepts and follow good research design. If new stimuli are introduced i.e., if something is done about the situation, a experiment is created to test his hypothesis still further. Until the theoretical framework of sociology becomes very abstract many of its basic problems and concepts will not be far removed from common sense, and applied research offers

an opportunity to test the validity of existing theory.

3. Applied Research may aid in conceptual classification:

As in any changing science, many sociological concepts are not precise. Such notions as integration of the social structure, "function", class, "adjustment, as primary relationship, occasion considerable argument among sociologists. Since the referents of these terms are not entirely clear. Lack of clarity becomes crucial when research is planned. If we wish to knew the consequences of social integration in a neighborhood or group, we have to find techniques for observing or measuring that integration. In order to do this, however, we have to clarify our concept considerably. A concept exhibits its vagueness most sharply when we begin to define the procedures and operations for dealing with it in research.

A contribution of applied research may be the development of concepts, especially when the central use of a concept has not received much attention in theoretical Sociology.

4. Applied Research May integrate previously existing theory:

Problem solving typically draws upon many sciences, for the problem is concrete and cannot be solved by the application of abstract principles from single science Bridge construction, for example, may draw upon such disciplines as economics, hydrostatics, stress analysis, demography, chemistry etc. 'Slum clearance' requires the data studied by the criminologists, the social worker, the sociologist and others. Thus the solution of a concrete problem may require some integration of the findings from many theoretical as well as applied investigations in several fields. The same principle must be applied, however, within sociology studies of socialisation may be used in planning for the interaction of children from different ethnic groups or in developing a program for adult education in designing the project that replaces the slum. Demographic data must be used to calculate the expected number of children in the schools and to plan community reaction studies of

neighboring behaviour of the impact of physical relation upon social interaction, of the basis for community participation may be used in laying out the building entrances or locating the community center.

B From the side of pure research :

1. **By developing General Principles, theory offers solutions to many practical problems:** The abstractness which removes a scientific generalisations from ordinary experience also gives it a broader application when we have as certained the differential effects of various kinds of social backgrounds upon intellectual achievements in IQ tests, we can apply these rough principles to the analyses of test grades made by southern Negroes or by San Francisco Chinese, Americans. We can predict what will happen when these groups migrate to other areas, as when new opportunities are given them; we can interpret more easily the different achievements of class strata. Although these judgements are not so precise or so well established as, say, those relating to the interaction between air pressure, altitude, boiling point etc., they are similar in that there are many practical applications. Indeed it can be said that nothing is so practical for the goals of diagnosis or treatment as good theoretical research. Too often, in contrast, practical problem solving confines itself to the concrete immediacy, so that the result is not applicable else where.

2. **Pure research helps to find the central factors in a practical problem :** All too often, those who adopt a common-sense approach see the problem in traditional ways and fail to abstract the key factors. As a consequence, the solution is likely to be an inefficient one. For example in an area torn by social dissension, a playground director may "solve" the problem of going fights between boy of different races by alloting different playground hours or days to the various gangs. This may work, in the sense that the fight are avoided. However since, it fails to grapple with the causes of the tension and this outlet for it, the solution is inefficient and very likely helps to maintain

the existing situation.

On the other hand, by the development and application of general principles of social interaction, group morale and cohesion, socialisation, it is possible to work out a solution that both avoids gang fights and integrates these different groups. Theoretical knowledge, then, can go beyond more common sense.

3. **Research as an answer to problem may become a standard procedure for the administrator :** Pure research may have effect upon the pattern of administrations procedure, as the practitioner learns of its utility. This development has not been a common one, but both governmental and business organisations have begun to utilize, "research and planning units" to evaluate the techniques which have been applied in the past and to develop new solutions to old as well as new problems. Such a unit may be given considerable freedom in its investigation. Large industrial corporations have, of course, sued such units particularly in the biological and physical sciences. However, the utility of social research units is obvious for both non-industrial and industrial organizations, since problems of social relations are common to both. What is central to this development is the belief that problems should be anticipated where possible, that traditional procedures may always be questioned, and that, the development fairly, general principles can be a practical activity. Thus the pattern of pure research has an effect upon the solution of practical problems in that its aims and procedures become the usual long term approach to the latter type of problem.

4. **Theoretical research develops many alternative solutions, with the result that alternative costs may be weighed and ultimately reduced:**

The solutions that theoretical research first develops are likely to be very expensive. Most of the applications of science which have become

common in our civilization the radio, television, Sun lamps were originally laboratory appliances, unwieldy costly and inefficient. The first isolation of elements has almost invariably required a relatively large expenditure of time and money. However, pure science characteristically continues the investigation beyond a workable solution to more precise generalizations, discovery of the essential factors, and ascertainment of the exact conditions under which the process operates. Consequently after a time there are many solutions for a given type of problem with different main and subsidiary consequences. We are thus permitted to choose the best solution for our practical problem.

Check Your Progress

i) What is meant by basic research ?

_____

_____

ii) What is meant by Applied Research ?

_____

_____

6.6 LET US SUM UP

In conclusion we can say that in the development of sociology we cannot think of pure and applied research as being opposed. The two are not mutually exclusive. There is interplay between them, and these can be still more. Good basic research may be applicable to practical problem and applied research can contribute to theoretical sociology.

What is essential is that even in applied research, a scientific frame of reference should be kept in mind. For ultimately, the great power of science appear to lie in the development of general principles which are applicable to many concrete problems. If practical programs of research have contributed less to science than might be desired, this reflects the need

for more adequate scientific training and a more self-conscious scientific approach on the part of those who carry out the research.

6.7 SUGGESTED READINGS

1) Burgess, Earnest W. and Learned 5.Cattrell, The prediction of success or failure in marriage (New York, Prentice Hall 1939).

2) Landberg G.A., Social research (New York : Longmans.1942). 2nd ed PP 1-16.

6.8 ANSWERS TO CHECK YOUR PROGRESS

i) It pursues knowledge for the sake of knowledge itself.

_____

_____

ii) It is concerned with search for ways of using scientific knowledge to solve practical problems.

_____

_____

EXPLORATORY RESEARCH

STRUCTURE

7.1 INTRODUCTION

Exploratory research is mostly carried out when there is not sufficient information available about the issue to be studied, or, in other words, the researcher has either no knowledge or a limited knowledge. For example, in the study of effect of T.V. on young students, what may be explored is the magnitude of the problem or what percentage of students watch T.V., the types of programmes preferred, frequency of watching T.V. Effect on studies impact on intra-familial relatives, and so on.

7.2 OBJECTIVES

This unit aims at presenting the different aspects of exploratory research.

After reading this unit you will be able to understand :

- Meaning of explanation research
- Different areas and types of exploratory research
- Different examples of exploratory research

7.3 MEANING

This research studies subject about which either no information or little information is available. Generally this type of research qualitative which becomes useful in formulating hypothesis or testing hypothesis and theories. In this research the assumption is that researcher has little or no knowledge about the problem or situation. Under study, or he is unfamiliar with the structure of the group he is studying (say prison, industry, university, village and so on). As an example in an exploratory study of a prison, the researcher points out how a prison is divided in barracks words; what type of work is assigned to different types of prison officers; what recreational, medical educational etc., facilities are provided to prisoners, what rules they have to follow in interacting with other inmates or with officials, how are they to maintain contacts with the outside world; and so on. The researcher also comes to explore how prisoners reject the prison norms and come to follow the norms of the inmate world, say, always keep grumbling about the food, work and the facilities provided always work less, don't reveal the secrets of inmates to prison officials, and so forth.

Or, suppose a researcher is interested in exploring student's unrest in a university campus. He will study dissatisfaction of students regarding various problems they point out, administrators apathy to these problems, students organising under a leader for demonstration ghero strike etc. type of students who become active, the support they seek and get from outside agencies, how widespread the unrest becomes, how it is suppressed by the police, how leaders are arrested, and how authorities are pressurised to concede some demands

7.4 REASON FOR EXPLORATORY RESEARCH

According to Sarantakas, the exploratory study is undertaken for following reason :

(1) **Feasibility :** to find out whether the study on the issue in question is warranted, worth while and feasible.

(2) **Familiarisation:** to familiarise the researcher with the social context of the issue, i.e., details about relationships, values, standards and factors related to the research topic.

(3) **New Ideas :** to generate ideas, views and opinions on the research issue which will help in proper understanding of the problem.

(4) **Formulation of hypothesis :** to show whether variables can be related to each other.

(5) **Operationalisation :** to operationalize concepts by explaining their structure and by identifying indicators.

According to Babbie, exploratory studies are conducted for three purposes.

(1) to satisfy researchers's curiosity and desire for better understanding.

(2) to test the feasibility of undertaking a more extensive study and (3) to develop the methods to be employed in any subsequent study.

Zikmund, has stated three purposes of exploratory research :

(1) **Diagnosing a situation :** The situation diagnosis clarifies the nature of the problem and explores its different dimensions e.g. in an exploratory research or worker's strike, the preliminary interviews with the workers may be utilised to get information on problems pertaining to working conditions, wages, safety measures, extra moral facilities, sharing profits, career opportunities, and the like.

(2) **Screening Alternatives :** It involves determining various alternatives pertaining to the issue. In worker's strike alternatives for the workers could be frequent dialogue with division makers, appointing a labour officer

who focuses on protecting workers interest, nominating workers on decision making bodies, introducing profit sharing scheme, and so on. Although this aspect of exploratory research is not a substitute for conclusive research, certain evaluative information can be acquires in such studies. This research is also used for testing concepts which help in research procedures.

(3) **To generate new Ideas :** Factory workers perhaps have suggestions for increasing production profits, decreasing dissatisfaction and conflicts, improving safely, etc.

Exploratory studies are also appropriate for some persistent phenomenon like deficiencies in functioning of educational system, corruption among political elite, harassment by police rural poverty, and so on. We can give one example. The researcher wants to find out the changing popularity of two main political parties among people in India. He collects information about seats won and percentage of votes secured by the BJP and the congress in 13th Lok Sabha election. He gets the following information.

Year	BJP		Congress	
	Seats won	% of votes secures	Seats won	% of votes secured
1952	3	3.1	364	45.0
1957	4	5.9	371	47.8
1962	14	6.4	361	44.7
1967	35	9.5	283	40.8
1971	22	7.4	352	43.7
1977			154	34.5
1980			353	42.7
1984	2	7.4	415	48.1

1989	86	11.5	197	39.5
1991	120	20.1	232	36.5
1996	161	20.3	140	28.8
1998	182	25.6	141	25.8
1999	182	27.5	112	23.8

He thus points out the increasing popularity of the BJP and the decreasing popularity of the congress from 1989 onwards. No wonder, in recent opinion poll also conducted by TNS-MODE in four Metros-Delhi, Calcutta, Mumbai and Chennai- with 8,251 respondents in 18-50 age group to gauge the public perception of BJP's one year in office (October 1999 to October, 2000), 11 % described it excellent, 37% good 39% average, 6% poor and 7% very poor. The congress is now perceived as a corrupt, faction ridden and leaderless party, while the BJP is perceived as a party interested in solving Kashmir problem (31%), having economic policy of raising living standard (25% good, 35% average, 40% poor) and handling foreign policy and internal security in a much better way (57% good, 31% average, 12% poor).

7.5 AREAS OF EXPLORATORY RESEARCH

Zikmund has pointed out the following areas of exploratory research in business :

(1) General Business Research

(i) Business trend

(ii) Short/long range studies

(iii) Import/export studies

(iv) Acquisition studies

(2) Financial and Accounting Research

(i) Impact of taxes.

(ii) Loans and credit-risk studies.

(iii) Return-risk studies

(iv) Research on financial institutions

(3) Management Research

(i) Leadership style

(ii) Structural studies

(iii) Physical environment studies

(iv) job satisfaction

(v) Employee morale

(4) Sales and Marketing

(i) Measuring Market potentials

(ii) Sales analysis

(iii) Advertising Research

(iv) Buyer behaviour research

(5) Corporate Responsibility Research

(i) Ecological impact

(ii) Legal constraints

(iii) Social values

We can point out some other examples of exploratory Research.

(a) A manager notices that workers grievances are increasing and production is decreasing. He wishes to investigate the reasons.

(b) The manufacturer of dish washing machine wishes to forecast sales volume for the next five years.

(c) A publisher wishes to identify the demographic characteristics of teachers who wish to spend more than Rs. 2000 per year on books.

(d) A financial analyst wishes to investigate whether monthly income scheme or cumulative schemes as mutual fund scheme has a higher yield.

7.6 TYPES OF EXPLORATORY RESEARCH

Exploratory studies can be of many forms, depending on the nature of the main study, the purpose of the research and the purpose of exploration, etc.

Selltiz et al (1976) have referred to following three forms.

(a) **Review of available literature :** This involves a secondary analysis of available information already published in some form. The available information about structure process, and relationships of the particular phenomenon with varied factors, can help in linking it with the study currently planned. It may also help in a historical or comparative analysis of the issue or in reviewing a theory simply by looking at the ways other researchers have approached the topic.

(b) **Expert Survey :** These involve interviews with experts who have substantial knowledge and experience in the research area although their findings have not been published yet.

(c) **Case Studies :** This type refers to "insight stimulating examples" single case relevant to the issue are selected and studied in order to collect information for the main study.

Most projects employ more than one type of exploratory study Zikmund has also given three categories of exploratory research :

(i) experience surveys

(ii) Secondary data and analysis, and

(iii) Pilof studies

(a) **Experience Surveys :** The researcher can discuss his research issue

with other researchers who have worked on similar problems or who have some specialised knowledge and experience to share.

For example, a person who wants to work on panchayati Raj can discuss his problem with those sociologists, economists, political scientists and public administrators who have already worked in this area and can modify his design of research on the basis of their experiences. Experience survey, i.e. discussions with knowledgeable people in one's own and other disciplines may be quite informal. It could be only in the form of conversation. Selltiz has called this type of research as "expert survey research".

(b) **Secondary data analysis :** This refers to getting information from secondary sources like books, documentations, reports and so on. Investigating data, compiled for some purpose other than the project at hand, provide valuable information to the researcher. Selltiz has called this type of research as "Literary Preview Research"

(c) **Pilot studies :** what determines the type of research-descriptive exploratory, explanatory depends upon its purpose rather than techniques. Same study can be used for more than one purpose. Pilot study is an informal exploratory investigation which serves as a guide for a larger studies.

Check your Progress :

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

i) What is meant by Exploratory Research ?

_____

_____

7.7 LET US SUM UP

We can say that an exploratory study is the primary stage of research the next stage is occupied by the descriptive study and the final stage of research is to find out causal relationship. However, a study can very well be a mixture of different elements, namely exploration, descriptive and experimentations.

It has to be noted that exploratory studies fed to insights and formulation of hypothesis; but the hypothesis are not tested in such studies. For testing hypothesis, we require more carefully controlled studies. Exploratory study is not simply interested in testing hypothesis as such.

Exploratory studies are quite valuable in social sciences. They are essential wherever a researcher is breaking new grounds. But the chief short coming of the exploratory studies is that they seldom provide satisfactory answers to research questions, though they can give insights into the research methods that could provide definite answers. Failure to give definite answers is because this type of research lacks representativeness.

7.8 SUGGESTED READINGS

1) Zikmund, William, business research methods, The Dry Den press..

2) Singleton, Royce and Bruce C. Straits Approaches to social research (3rd ed) Oxford university press, New York, 1989.

7.9 ANSWERS TO CHECK YOUR PROGRESS

i) It is mostly carried out when there is not sufficient information available about the issue to be studied.

*****

DESCRIPTIVE RESEARCH

STRUCTURE

8.1 INTRODUCTION

Descriptive research describes social situations, social events, social system, social structures etc. The researcher observes/studies and then describes what did he finds? Take for example, the research on drug abuse. The Ministry of social welfare, Govt. of India assigned this study in 1976, 1986 and 1996 to teams of scholars (doctors, sociologists, criminologists) to study the extent of drug abuse among college students, nature of drugs taken, causes of drug taking, sources of getting drugs, effects of taking drugs, and so on. Since collecting data on scientific basis for descriptive studies is careful and deliberate, Scientific descriptions are typically more accurate and precise than casual ones.

8.2 OBJECTIVES

This unit aims at presenting different dimensions of Descriptive research. After reading this unit you will be able to understand :

- Meaning of descriptive Research
- Research design for descriptive Research
- Different examples of descriptive research

8.3 MEANING

Descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual, as a group. It is concerned with specific predictions, with narration of facts and characteristics concerning individual, group or situation are all examples of descriptive research studies. Most of the social research comes under this category. In descriptive research, the researcher must be able to define clearly, what he wants to measure and must find adequate methods for measuring it along with a clear cut definition of "population" he wants to study. Since the aim is to obtain complete and accurate information in the said studies, the procedure to be used must be carefully planned. The research design must make enough provision for protection against bias and must maximise reliability, with due concern for the economical completion of the research study.

- The design in such studies must be rigid and not flexible and must focus attention on the following :

a) Formulating the objective of the study (what the study is about and why is it made?)

b) Designing the methods of data collection.

c) Selecting the sample.

d) Collecting the data.

e) Processing and analysing the data.

f) Reporting the finding.

In a descriptive study the first step is to specify the objectives with sufficient precision to ensure that the data collected are relevant. If this is not done carefully, the study may not provide the desired information.

Then comes the question of selecting the methods by which the data are to be obtained. In other words, techniques for collecting the information must be devised. Several methods (viz, observation, questionnaires, interviewing, examination of records etc.), with their merits and limitations, are available for the purpose and the researcher may use one or more of these methods. While designing data collection procedure, adequate safeguards against bias and unreliability must be ensured whichever method is selected, questions must be well examined and be made unambiguous; interviewers must be instructed not to express their own opinion, observers must be trained so that they uniformly record a given item of behaviour. It is always desirable to pre-test the data collection instruments before they are finally used for the study purposes. In other words we can say that "structured instruments" are used in such studies.

In most of the descriptive studies the researcher take out sample(s) and then wishes to make statements about the population on the basis of the sample analysis or analyses. More often than not sample has to be designed. The problem of designing samples should be tackled in such a fashion that samples may yield accurate information with a minimum amount of research effort. Usually one or more forms of probability sampling, or what is often describes as random sampling are used.

To obtain data free from errors introduced by those responsible for collecting them, it is necessary to supervise closely the staff of field workers as they collect and record information. Checks may be set up to ensure that the data collecting staff perform their duty honestly and without prejudice. "As data are collected they should be examined for completeness, comprehensibility, consistency and reliability".

The data collected must be processed and analysed. This includes steps like coding the interview replies, observation etc., tabulating the data; and performing several statistical computations. To the extent possible, the processing and analysing procedure should be planned in detail before actual work is started this will prove economical in the sense that the research may avoid unnecessary labour such as preparing tables for which he later finds he has no use or on the other hand, re-doing

some tables because he failed to include relevant data. Coding should be done carefully to avoid error in coding and for this purpose the reliability of coders needs to be checked. Similarly, the accuracy of tabulation may be checked by having a sample of the tables-redone. In case of mechanical tabulation the material must be entered on appropriate cards which is usually done by punching holes corresponding to a given code. The accuracy of punching is to be checked and ensured.

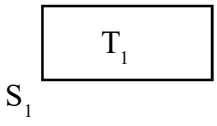
Finally statistical computations are needed and as such averages, percentages and various coefficients must be worked out. Probability and sampling analysis may as well be used. The appropriate statistical operations, along with the use of appropriate tests of significance should be carried out to safeguard the drawing of conclusions concerning the study.

Last of all comes the question of reporting the finding. This is the task of communicating the findings to others and the researcher must do it in an efficient manner. The layout of the report needs to be well planned so that all things relating to the research study may be well presented in simple and effective style.

Thus the research design in case of descriptive studies is a comparative design throwing light on all points narrated above and must be prepared keeping in view the objectives of the study and the resources available. However it must ensure the minimisation of reliability of the evidence collected. This said design can be appropriately referred to as a survey design since it takes into account all the steps involved in a survey concerning a phenomenon to be studied.

8.4 DESIGN FOR DESCRIPTIVE RESEARCH

Generally, in a descriptive research, the data are collected in a single situation (S_1) pertaining to single time period (T_1). This is called a one-cell design which can be diagramatically shown as below :



It is (S_1T_1) example is studying wife battering cases through snowball method in one selected neighbourhood (area) in a city in one time. But, the study pertaining to one situation (or issue) can be made in two time period also, as shown below:

	T_1	T_2
S_1		

This is commonly known as longitudinal design and is called two cell design, e.g., studying drug abuse among truck-drivers first in 1995 and again in 2000. When the study is comparison of two periods, present and past it is known as ex-post facto design e.g. comparing present status of women with status before independence.

Its other form will be that the study is made in two situations (areas) at one particular time, as illustrated below:

	S_1	S_2
T_1		

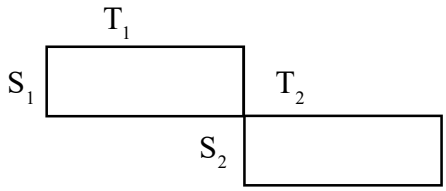
For example, studying drug abuse among truck-drivers in Jaipur and Delhi. If the study covers three (or more) times, it will be considered as three (or more)-cell design and diagrammatically presented below:-

	T_1	T_2	T_3	T_4
S_1				

This is also called a panel design. If the study covers two situation at two times, it will be four cell design, as shown below:

	T_1	T_2
S_1		
S_2		

If the data are collected from one situation at one time and from another situation at another time, it will be called a matched stage study. Diagrammatically, it can be displayed as under:-



For example, studying voting behaviour in Jaipur in 1998 parliamentary elections and then in Delhi in 1999 parliamentary elections.

Examples: We can point out many examples of descriptive research, e.g.,

The researcher wants to describe the increasing political participation of women in India. He collects information about the number of women candidates elected in 13 Lok Sabha elections from 1952-1999. He finds out that out of 499-543 seats, women got 22 seats in 1952, 27 in 1957, 34 in 1962, 31 in 1967, 22 in 1971, 19 in 1977, 28 in 1980, 44 in 1984, 27 in 1989, 39 in 1991, 40 in 1996, 43 in 1998 and 40 in 1999. He thus describes the increase in women's political participation from 1984 onwards. However comparing women's rank in India in four different areas with those of six other countries, he finds that women's ranking in India is not high.

Country	**Seats in Parliament**	**Administrators and Managers**	**Professional and technical workers**	**Central Ministry**
India	8.8	2.3	20.5	9.0
U.S	11.2	42.0	52.0	21.1
Japan	7.7	8.5	41.8	6.7
Sweden	40.4	38.9	64.4	47.8
Iran	4.0	3.5	32.6	0.0
Bangladesh	9.1	5.1	23.1	5.0
Pakistan	3.4	3.4	20.1	4.0

Another example of descriptive study is the census in India. The census data describes accurately and precisely a wide variety of characteristics of the

population as well as the population of different states and different communities. The 2001 census started from February 8, 2001 also aims at this description.

The voting forecast given on the basis of survey conducted by different organisations/TV channels before and after the parliamentary elections (including the exit poll in the 13th Lok Sabha elections) described the voting pattern of the electorate. The productive marketing survey also describes people who use or would use a particular product. Social anthropologists give details of particular culture of some tribal society.

Check Your Progress

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

i) What is meant by Descriptive Research ?

_____

_____

8.5 LET US SUM UP

In conclusion we can say that the major goals of a descriptive research is to describe events, phenomena and situations. Since description is made on the basis of scientific observation, it is expected to be more accurate than casual. Some examples of descriptive research are : the nature and magnitude of domestic violence against women, the problems and adjustment of war widows alcoholism among youth, sub-culture of hostlers, exit polls conducted by various orgainsations describing the voting patterns of electorate and so forth. The study of drug abuse among college students in different universities in 1976 sponsored by the Ministry of welfare, Government of India is an example of descriptive research.

8.6 SUGGESTED READINGS

(1) Manheim, Henry, Sociological Research, Philosophy and Methods, The Dorsey Press, Illinois, 1977.

(2) Black, James and Champions Dem J, Methods and issues in social research, John Wiley and sons, New York, 1976.

(3) Festinger, Fred N, Foundations of Behavioural Research Holt, Rinchart and Wiston, New York, 1964.

8.7 ANSWERS TO CHECK YOUR PROGRESS

(i) It describe social situations, social events, social system social structures etc.

*****

EXPERIMENTAL RESEARCH

STRUCTURE

9.1 INTRODUCTION

Experimental design is concern with making experiments to find out the cause-effect relationship of the phenomenon under study, Experimental Research is also known as the study of casual relationship, whose main purpose is to test the casual hypothesis. It is considered to be the highest stage of social research. Science tries to explain the phenomenon, as to determine its causes. This can be done by testing the casual hypothesis. The experimental method not only reduces personal bias but it also helps to draw inferences about causality.

9.2 OBJECTIVES

This unit aims at presenting experimental research. After reading this unit you will be able to understand

- Meaning and explanation of experimental Research.
- Design for experimental Research.
- Types of experimental Research.

9.3 MEANING

Experimental research (hypothesis testing research studies) are those where the researcher tests the hypothesis of causal relationship between variables. Such studies require procedures that will not only reduce bias and increase reliability but will permit drawing inferences about causality. Usually experiments meet the requirement. Hence, when we talk of research design in such studies, we often mean the design of experiments.

Professor R.A. Fishers name is associated with experimental research designs. Beginning of such designs was made by him when he was working at Rothamsted experimental station centre for agricultural research in England). As such the study of experimental designs has its origin in agricultural research. Professor Fisher found that by dividing agricultural field or plots into different blocks and then by conducting experiments in each of these blocks, whatever information is collected and inferences drawn from them, happens to be more reliable. This fact inspired him to develop certain experimental designs for testing hypothesis concession scientific investigations. Today, the experimental research is being used in researches relating to phenomena of several disciplines Since, experimental designs originated in the context of agricultural operations we still use, though in a technical sense, several terms of agriculture in experimental designs.

9.4 DESIGN FOR EXPERIMENTAL RESEARCH

Explanation : It is a research/design in which some of variables being studied are manipulated or which seek to central conditions within which persons are observed. Here "Central " Means holding one factor constant while other are free to vary in the experiment. One variable (independent) is manipulated and its effect upon another variables which may confound such a relationship are eliminated or controlled e.g. not giving a break of ten minutes or so between starting work and

lunch hour and again between lunch hour and closing hour to workers in supposed to be very hazardous. Will the break remove their physical discomfort and effects on eyes? The experiments studies the effect through comparison with experiment and without experiment. When the two groups of workers (getting tea break and not getting break) with identical job are compared, they exhibit differences in the perception of physical discomfort that lingered after work. This shows how by manipulating the independent variable (tea-break), change in the dependent variable (increase in production) are measured.

The design in the experimental research thus consists of two types of groups :

(i) Central-group : which is not exposed to experimental variable and

(ii) Experimental group : which is exposed to experimental variable. We may take the following illustration (of adjustment of old person) to explain it :

1. Elements of situation X → Produce A

a b c

(income) (family composition) (change in value)

→ (Adjustment of old persons)

2. Elements of situation Y→ Produce non-A

a b Non c

3. Therefore, C → Produce A

This shows the adjustment of old persons is not possible without change in their value.

- The following examples further explains experimental design by keeping one factors constant in two groups of students:

G1 = group of students not exposed to teacher's lecture on strike (central group)

G2. Group of students exposed to teacher's lecture on strike.

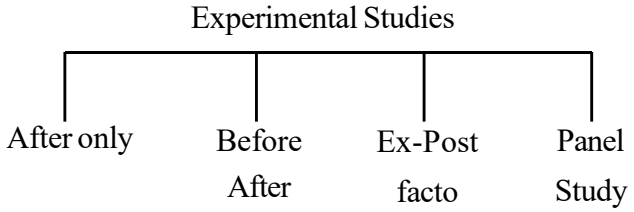
(experimental group)

G_1 (students attitude towards strike)	G_2 (Students attitude towards (strike)
Favourable : 50 Unfavourable: 20 Total : 70	Favourable : 25 unfavourable: 45 Total : 70

The experimental variable is "teacher's lecture on strike". The above example shows how the experimental group (G2), after being exposed to experimental variable (lecture) changes its attitude towards strike.

9.5 TYPES OF EXPERIMENTAL RESEARCH

These are mainly the following four types of experimental studies :



1. After-only experimental research design :

In this research, the experimental group and the central group are similar. The uncontrolled external factors may effect both the groups equally. The experimental group is exposed equally. The experimental group is exposed to the assumed casual variable (X), but the central group is not exposed. After the experiment is over, both groups are compared, and it may be noticed that some effect (Y) is produced in the experimental group, but not in the central group,. This X is regarded as the cause and Y is regarded as the effect. In "After -only" design, the two groups are assumed to be exactly similar.

This may not be true. Secondly, it is possible that Y is produced not by X, but by some other external factors, as by the joint interaction of X and other external factors. These are the two main limitations of the method.

2. Before and After Experimental Research Design :-

Design : In this design, the dependent variable, i.e. effect is measured both before and after the exposure of group/ groups to experiments. The experiment may use one group or several groups. There may be one central group or more than one central groups. In the before-after experiment, the group/groups are measured or observed before the experiment and after the experiment, and the difference that is produced after the experiment is made, is said to be the effect (Y) of the experimental variable (X). The design provides evidence of concomitant variation between X and Y, by making a comparison of Y in the group exposed to X with Y in the group not exposed to X. The second evidence of causality, i.e. X coming before Y, can be inferred from the fact of randomisation that the groups are similar with respect to Y. The equivalence with respect to Y at the outset can be ensured by the 'before' measures of the two groups.

When there are two groups one experimental group and the other central group-both of them are measured at the beginning and also at the end of the experimental period. However, experimental variable is introduce only in the experimental group. Since both the groups are subject to before measurement" and the uncontrolled factors, the difference between the two groups is regarded as the effect at the experiment at variables alone.

The greatest weakness of this design is that during the experiment a group may be influenced by the external factors in a different way than the other group for there is nothing to ensure uniform change. However the design is more reliable than "After-only" design. But the difficulty of finding exactly similar groups in all respects cannot be easily

remedied. Even the "before measurement" technique may not be able to measure all the differences and common features in mathematical exactitude.

3. Ex-Post Facto Experimental Research Design :

Sometimes it is not possible to divide population into two clear and similar groups. This may be the cause where the entire society consisting of different varieties of people and conditions are involved. It may be necessary to study the entire historical background of a country. For instance, if a researcher is interested in studying the causes of a revolution which has already occurred, he will not be able to objectively study, the exact situation that was prevailing before the revolution in the country. He has to depend on the historical background of a country and this will be studied through the expost facto experiment. In this particular case, the investigator will select two countries - one in which revolution has been taken place and the other, where it has not. The countries otherwise should broadly be similar. Then through the comparative study of the conditions of the two countries, the researcher may be able to find out the cause of revolution. In the Ex-post facto study, part is studied through the present. But in other types for experiments, we try to prognosticate about the future from the present.

The most serious limitations of this method of study is the difficulty of finding out two similar groups or countries which are comparable. It is also very difficult to find out an objective criterion of comparability. Second, it is not possible to create artificial conditions or to have controlled conditions for study. In such a study, "before after" experiment is not possible. However, this type of study may throw considerable light on the causes of the present happening on the causes of the present happenings by "raking' up the past.

4. Panel Study :

It is method of study of a particular subject overtime by using different kinds of data. In this study, the researcher may secure direct evidence of time relationship among variables. It involves repeated observation on the same subject at different periods of time. In a sense, it is a type of time series study. The common subject which is again and again observed and studied, constitutes a 'Panel' for the researches.

In the panel technique the variation in the result may be attributed to a real change in the phenomenon. It is a continuous through deep and reliable. However, it has also many limitations, e.g. loss of panel members, non-representativeness, rigid attitudes of the members and so on.

CHECK YOUR PROGRESS

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

i) What is meant by Experimental Research

_____

_____

ii) Discuss different types of experimental Research.

_____

_____

9.6 LET US SUM UP

We can conclude that experimental design is concerned with making experiments to find out the cause-effect relationship of the phenomenon under study experimental study is also known as the study of casual relationship, whose main purpose is to test the casual hypothesis.

It is considered to be the highest stage of social research. Science tries to explain the phenomenon, or to determine its causes. This can be done by testing the casual hypothesis. The experimental Method not only reduces personal bias but it also helps to draw inferences about causality.

9.7 SUGGESTED READINGS

(1) Black James A. and Dean J. Champion, Methods and Issues in social research, John Wiley, New York, 1976.

(2) Manheim, Henry, Sociological Research. Philosophy and Methods The Porsey press, Illinois,1977.

(3) Babbie, Earl, The practices of social research (8th ed). Nadswarth Publishing Co. Albany, New York, 1998.

9.8 ANSWERS TO CHECK YOUR PROGRESS

(i) It is concerned with making experiments to study cause and effect relationship.

ii) Different types are as follows :

a) Panel Study b) After Only

c) Ex-Post Facto d) Before and After

MEANING AND SIGNIFICANCE OF SAMPLING

STRUCTURE

10.1 INTRODUCTION

While conducting a survey, a question is usually asked : should all people be studied or only a limited number of persons drawn from the total population be studied and then extend our findings about the sample to the entire population? "Population refers to, all those people with the characteristics which the researcher wants to study within the context of a particular research problem." A population could be all students in the college, all patients in the hospital, all prisoners in the prison, all customers in a big departmental store, all users of a particular model of car, all households in the village, all workers in the factory, all cultivators using the water of a particular canal in the settlement area for irrigational purposes, all victims of a natural disaster in a particular area and so on. When the population is relatively large and is physically not accessible, researchers survey only a sample.

A sample is a portion of people drawn from a larger population. It will be representative of the population only if it has same basic characteristics of the population from which it is drawn. Thus our concern in sampling is not about what types of units (persons) will be interviewed/observed but with how many units of what particular description and by what method should be chosen. Suppose a large number of thefts are reported in one week in one area three kilometers long in a city. The area consists of seven sectors, each sector consisting seven lanes, each lane having 15 houses on the front side and 15 on the back side. Thus, the city will have 1500 house holds. It is planned to find out if all households in this area will support a community watch programme in which each household would take the responsibility for deputing one male member of performing the night watch duty. Have all 1500 households to be included in finding out whether the scheme will be acceptable to the people, or only a sample of people from each of the seven sectors will be enough to get the idea? The answer to this question, whether all people or just a sample need to be studied in a survey depends on five factors:

1. How quickly are data needed?
2. What type of survey is planned? Will it be a telephone survey, or a self-administered questionnaire sent by post or through an investigator or will it be a schedule in which answers to questions are to be filled in by the investigator himself?
3. What are the available resources? Is there money to appoint an investigator and to get the questionnaire printed/cyclostyled? Do all people have telephone?
4. How credible will the findings be? In the above example, even if 70 to 80% households agreed to participate then it would be fine. But if only 30 to 40% wanted to participate, it would be preferable to scrap such survey.
5. How familiar is the researcher with sampling methods ?

According to Manheim, " a sample in a part of the population which is studied in order to make inferences about the whole population." In defining population from which the sample is taken, it is necessary to

identify target population from which the sample is taken, it is necessary to identify target population and sampling frame. The target population is one which includes all the units for which the information is required e.g. drug abuser students in one university, or voters in one village/constituency and so on. In defining the population, the criteria need to be specified for explaining cases which are included or excluded. For example, for studying the level of awareness of rights among women in one village community, the target population is defined as all women-married and un-married in the age-group of 18-50 years. If the unit is institution (say a university) then the type of its structure size as measured by the number of students in school selection, college section and in professional courses, the number of teachers and employees needs to be specified.

For making the target population operational, the sampling frame needs to be constructed. This denotes the set of all cases from which the sample is actually selected. It should be noted that sampling frame is not a sample; rather, it is the operational definition of the population that provides the basis of sampling. For example in the above example of University, if students studying in school upto 12th and in college upto MA/M.Sc one excluded only students of professional courses are left out from which the sample is to be drawn. Thus, the sample frame reduces the number of total population and gives us the target population.

Bailey has said that the experienced researchers always start from the top (population) and work down to bottom (sample) i.e. they get a clear picture of the population before selecting the sample. The novice researchers on the other hand often work from the bottom up. Instead of making the population, they wish to study explicit, they select a predetermined number of conveniently available cases and assume that the sample corresponds to the population under study. For example, in exit polls, seeking randomly the opinion of the voters as to whom they voted, soon after their casting the votes in a few selected constituencies in selected cities and villages cannot be representatives of all voters. No wonder, the predictions of such exit polls do not come true.

10.2 OBJECTIVES

In this lesson you will learn:

- What is sampling
- Purposes of sampling
- Principles of sampling
- Advantages of sampling

10.3 PURPOSES OF SAMPLING :

A large population cannot be studied in its entirely for reasons of size, time, cost or inaccessibility, Limited time, lack of large amount often make sampling necessary. Sarantakos has pointed out the following purpose of sampling:

1. Population in many cases may be so large and scattered that a complete coverage may not be possible. Suppose, the Maruti Udyog Co. wished to find out the reactions of purchases of five-seater and eight seater Maruti vans.

   For this thousands of van purchasers would have to be contacted in different cities. Some of these would even be inaccessible and it would be impossible to contact all the van purchasers within a short time.

2. If offers a high degree of accuracy because it deals with a small number of persons. Most of us have had blood samples taken, sometimes from the fingers and sometimes from the arm or another part of the body. The assumption is that the blood is sufficiently similar throughout the body and the characteristics of the blood are determined on the basis of sample. Single ton and Straits have also said that studying all cases will describe population less accurately than a small sample.

3. In a short period of time valid and comparable results can be obtained. A lengthy period of data collection generally renders some data obsolete by the time the information is completely in hands.

For example, collecting information on the attitudes of the military personnels about non-availability of vehicles to be used in a very cold areas during the Kargil war, or voter's performances during election period, or demanding action against police persons in a lockup blind. Besides, opinions expressed at the time of incidence and those expressed after a few months are bound to be different. The findings are thus bound to be influenced if long period is involved in data collection i.e. not taking a small sample but studying the entire population.

4. Sampling is less demanding in terms of requirements of investigators since it requires a small portion of the target population.

5. It is economical since it contains fewer people. Large population would involve employing a large number of interviewers which will increase the total cost of the survey.

6. Many research projects, particularly those in quality control testing, require the destruction of the items being tested. If the manufacturer of electric bulbs wishes to find out whether each bulb met a specific standard, there would be no product left after the testing.

One important objective of sampling is to draw inference about the universe which is unknown from the unit which is observed or measured. Such inferring generalisation made in sociology is called "Sociological inference' while one made in statistics is called 'statistical inference'. Generalizations based on statistical inferences always are probability statements and are never statements of absolute certainly. Sociological inference may be either valid or invalid. It may involve either deduction or induction. Induction is generalisation from individual or specific instance to general principle. Deduction is generalisation from general principles to specific or particular instances. In this process, the generalisation is from sample to universe.

Two other purposes of sampling may also be specified here :

(a) Seeking representativeness and thereby studying a small population instead of very large population.

(b) Analysing data when (i) cross tabulation is required (ii) certain variables are to be controlled and (iii) phenomenon is to be observed under certain specific conditions.

10.4 PRINCIPLES OF SAMPLING :

The main principle behind sampling is that we seek knowledge about the total units (population) by observing a few units (sample) and extend our inference about the sample to the entire population. For purchasing a bag of wheat, if we take out a small sample from the middle of the bag with a cutter, it will give us the inference whether the wheat in the bag is good or not. But it is not necessary that study of sample will always give us the correct picture of the total population. If in a class of 100 students we take out any five students at random and per chance find all the 5 students are third divisioners. If few people in a village are found in favour of family planning, it would not mean that all people in the village will necessarily have the same opinion. The opinion may vary in terms of religion, educational level, age, economic status and such other factors. The wrong inference is drawn or generalisation is made from the study of few persons because they constitute inadequate sample of the total population.

The study of sample becomes necessary because study of a very large population would require a long period of time, a large number of interviewers, a large amount of money, and doubtful accuracy of data collected by numerous investigators. The planning of observation/study with a sample is more manageable.

The important principles of sampling are :

1. Sample units must be chosen in a systematic and objective manner.
2. Sample units must be independent of each other.
3. Sample units must be clearly defined and easily identifiable
4. Same units of sample should be used throughout the study.
5. The selection process should be based on sound criteria and should avoid errors, bias and distortions.

10.5 ADVANTAGES OF SAMPLING :

The advantages of sampling are :

1. It is not possible to study large number of people scattered in wide geographical area. Sampling will reduce their number.
2. It saves time and money.
3. It saves destruction of units.
4. It increases accuracy of data (having control on the small number of subjects)
5. It achieves greater response rate.
6. It achieves greater cooperation from respondents.
7. It is easy to supervise few interviewers in the sample but difficult to supervise a very large number of interviewers in the study of total population.
8. The researcher can keep a low profile.

CHECK YOUR PROGRESS NOTE :

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

i) What is meant by Sampling.

_____

_____

ii) Discuss various advantages of Sampling.

_____

_____

10.6 LET US SUM UP

Thus it can be Summarize that A sample is a portion of people drawn from a larger population. It saves our time and money and achieves greater response rate.

10.7 SUGGESTED READINGS

(1) Black James A. and Dean J. Champion, Methods and Issues in social research, John Wiley, New York, 1976.

(2) Manheim, Henry, Sociological Research. Philosophy and Methods The Porsey press, Illinois,1977.

(3) Babbie, Earl, The practices of social research (8th ed). Nadswarth Publishing Co. Albany, New York, 1998.

10.8 ANSWERS TO CHECK YOUR PROGRESS

i) A sample is a portion of people drawn from a Larger Population.

ii) The various Advantages of Sampling are as follow :-

a) It saves time and money.

b) It saves destruction of units.

c) It achieves greater response rate.

d) It increases accuracy of data.

TYPES OF SAMPLING : PROBABILITY SAMPLING

STRUCTURE

11.1 INTRODUCTION

While conducting a survey, a question is usually asked : should all people be studied or only a limited number of persons drawn from the total population be studied and then extend our findings about the sample to the entire population? "Population refers to, all those people with the characteristics which the researcher wants to study within the context of a particular research problem." A population could be all students in the college, all patients in the hospital, all prisoners in the prison, all customers in a

big departmental store, all users of a particular model of car, all households in the village, all workers in the factory, all cultivators using the water of a particular canal in the settlement area for irrigational purposes, all victims of a natural disaster in a particular area and so on. When the population is relatively large and is physically not accessible, researchers survey only a sample.

A sample is a portion of people drawn from a larger population. It will be representative of the population only if it has same basic characteristics of the population from which it is drawn. Thus our concern in sampling is not about what types of units (persons) will be interviewed/observed but with how many units of what particular description and by what method should be chosen. Suppose a large number of thefts are reported in one week in one area three kilometers long in a city. The area consists of seven sectors, each sector consisting seven lanes, each lane having 15 houses on the front side and 15 on the back side. Thus, the city will have 1500 house holds. It is planned to find out if all households in this area will support a community watch programme in which each household would take the responsibility for deputing one male member of performing the night watch duty. Have all 1500 households to be included in finding out whether the scheme will be acceptable to the people, or only a sample of people from each of the seven sectors will be enough to get the idea? The answer to this question, whether all people or just a sample need to be studied in a survey depends on five factors:

1. How quickly are data needed?
2. What type of survey is planned? Will it be a telephone survey, or a self-administered questionnaire sent by post or through an investigator or will it be a schedule in which answers to questions are to be filled in by the investigator himself?
3. What are the available resources? Is there money to appoint an investigator and to get the questionnaire printed/cyclostyled? Do all people have telephone?
4. How credible will the findings be? In the above example, even if 70 to 80% households agreed to participate then it would be fine. But if only 30 to 40%

wanted to participate, it would be preferable to scrap such survey.

5. How familiar is the researcher with sampling methods ?

According to Manheim, " a sample in a part of the population which is studied in order to make inferences about the whole population." In defining population from which the sample is taken, it is necessary to identify target population from which the sample is taken, it is necessary to identify target population and sampling frame. The target population is one which includes all the units for which the information is required e.g. drug abuser students in one university, or voters in one village/constituency and so on. In defining the population, the criteria need to be specified for explaining cases which are included or excluded. For example, for studying the level of awareness of rights among women in one village community, the target population is defined as all women-married and un-married in the age-group of 18-50 years. If the unit is institution (say a university) then the type of its structure size as measured by the number of students in school selection, college section and in professional courses, the number of teachers and employees needs to be specified.

For making the target population operational, the sampling frame needs to be constructed. This denotes the set of all cases from which the sample is actually selected. It should be noted that sampling frame is not a sample; rather, it is the operational definition of the population that provides the basis of sampling. For example in the above example of University, if students studying in school upto 12th and in college upto MA/M.Sc one excluded only students of professional courses are left out from which the sample is to be drawn. Thus, the sample frame reduces the number of total population and gives us the target population.

Bailey has said that the experienced researchers always start from the top (population) and work down to bottom (sample) i.e. they get a clear picture of the population before selecting the sample. The novice researchers on the other hand often work from the bottom up. Instead of making the population, they wish to study explicit, they select a predetermined number of conveniently available cases and assume that the sample corresponds to the population under study. For example, in exit polls,

seeking randomly the opinion of the voters as to whom they voted, soon after their casting the votes in a few selected constituencies in selected cities and villages cannot be representatives of all voters. No wonder, the predictions of such exit polls do not come true.

11.2 OBJECTIVES

In this lesson you will learn

- Key terms in sampling
- Types of sampling
  - Probability sampling
  - Non-probability sampling
- Probability sampling
  - Sample Random sampling
  - Stratified Random Sampling
  - Systematic or Interval sampling
  - Cluster sampling
  - Multi phase sampling

11.3 KEY TERMS IN SAMPLING :

Some basic terms or concepts in sampling can be understood by taking an example of a research project say 'Awareness of feminist movement among women in Rural areas' The study is being conducted in a village which is situated at a distance of 15 kms from the nearest city. The study is being conducted on married, unmarried women and widows belonging to the age group of 18-50 years. The total population of the village is 4800 of whom 2,200 are females and 2600 are males. Of the total females 834 (38%) belong to 0-18 age group 970 women in 18-50 age group, 74 are widows, 87 are unmarried and 809 are married. Age in the main variable of stratifying them in groups while educational level, religion, caste, family structure family more and occupation of the head of the family are the

variable's chosen for analysis purpose. We will use this example for understanding various terms and concepts.

Universe or Population :

The sum total or the aggregate of all units/cases that conform to some designated set of specification is called the universe on population. Since the total number of women in the above mentioned example is 2,200 in the whole village, our universe of potential respondents will consist of these 2,200 women in the village while the target of study will be 970 women in 18-50 years age group. In another example, the term 'student' might be the 'target' of study but the delineation of 'student population would include the particular educational institution, the particular department (say, MCA students only) or particular type of students (smokers or drug users) who are to be studied, Thus, 'population' in this example will be 'students of a particular institution and study population' will be only MBA students of that institution. The study population is thus that aggregation of elements from which the sample is actually selected.

A population may be a group of people, houses, workers, students, customers, cultivators, registered voters, legislators and so on. The specific nature of the population depends on the purpose of investigation.

If one is studying voting behaviour of people in a particular city with a population of 15 lakh, one has to remember that the population of voters in that city is not the same as the population of the city. Even " all the people in that city 18 years of age or older" is not a correct definition of the population of voters because the individual must be a 'registered' voter and all 'eligible' voters may not be 'registered' voters.

Sample :

It is a portion of total population. In the above example of women, out of the total population of 970 women in 18-50 years age

group, If we use the Mathematical formula $\frac{x}{1+n(e)^2}$ wherein n is 970 (total no. of women) and e is .05 (confidence level), the number comes to 283. Rounding off this figure we decide to study 300 women. Thus our random sample in the above

study will be 300 women. We can stratify these women in three groups on the basis of their age; 18-30 years (young), 30-40 years (early middle aged) and 40-50 years (late middle aged). We can take 100 women from each of these three groups.

Sampling Element :

Each entity (person, family, group, organisation) from the population about which information is collected is called a sampling element. In the above example, all the 970 married and unmarried women and widows in 18-50 years age group will be sampling elements.

Sampling Unit :

This is either a single member (element) or a collection of members (elements) subject to data analysis (and selection) in the sample For example, if the railway department wishes to sample passengers who have filled up the forms for reservation in a particular train during one week, every tenth name on a complete list of passengers may be taken. In this case, the sampling unit is the same as the element. Alternatively, the railway authorities could select trains as the sampling unit, then select passengers (seeking reservation in the sleeping coach, II AC coach, III AC coach and chains car coach) on the trains selected. In this case, the sampling unit contains many elements. In our example of awareness of rights among women in the village, the sampling units one married and unmarried women and widows in the age groups of 18-50 years registered in the voters list. A sampling unit is not necessarily an individual. It may be an event, a city, a village, or a nation.

Sampling frame :

It is the complete list of all units/elements from which the sample is drawn e.g. electoral roll, the list of patients in all wards in the hospital, the list of students of all classes in a college, and so on. For instance, take the issue of "awareness of rights among women". The total population of women in the village is 2,200. The number of women in the age group of 18-50 years is 970. This

(18-50 years women) would be the sampling frame. This number can be taken from the voter's list. Of course those women whose name does not appear in the voting list will be excluded. The sampling frame is also called the working population because it provides the list that can be operationally worked with. Thus, sampling frame is not a sample but it is the operational definition of the population that provides the basis for sampling.

Target Population :

Target population is one to which the researcher would like to generalise his results among women in the rural area, the target population is 970 women (married, unmarried and widows) in the age group of 18-50 years. In the target population the criteria are specified for determining which cases are included and which ones are excluded in the population.

We can take another example. All persons in a village may not be voters. Some may be below 18 years of age, some may not be registered some may be mentally eran or physically unable to walk and so on.

Thus the target population would be only "the registered voters in the village" Similarly, all students in a college may not be drug users. Only 5 to 7 percent of the total students or even less may be using drugs daily or occasionally. These drug users will be the target population for the researchers. It is vitally important to carefully define the target population so that it may be a proper source from which the data are to be collected. These could be some selected demographic variables such as residence, religion, caste, age, education, occupation, income and so on. In the above example, taking into consideration the object of the study, the combined criteria for the target population were : locale (village), gender (women) and age (18-50 years). In other words, our target population was defined as "rural women between the ages of 18 and 50 years"

Two characteristics that always implicitly on explicitly define the target population are geographic boundary and a distinctive time frame.

Sampling Trait :

It is the element on the basis of which we take out the sample from the total

universe. It could be qualitative (attribute) or quantitative (variable) element. In the above mentioned research the sampling traits are gender, age (18-50 years) and residence (village)

Sampling Fraction :

It is proportion of the total population to be inclined in the sample. For example in the above mentioned research on women's rights in a village, the total population of women in the village is desirable as 2,200, of whom 283 (or broadly 300) women are to be studied. The sampling fraction thus comes to one-seventh of population. The formula is

$$\frac{\text{Size of Sample}}{\text{Total Population}} \textit{or} \frac{\text{n}}{\text{N}}$$

This comes to $\frac{300}{2200}$ i.e., about one seventh of the total population

Sample Estimate :

It is an estimate from a sample value of what the value would be in the total population from which the sample is drawn. For example, in a college of 1200 students, a sample of 300 is drawn. The average age of students in this sample is found to be 19.1 years. In the total population it would be 19.6 years.

Biased Sample :

When the sample is so chosen that some elements are more likely to be represented than other elements, it is called biased sample. Suppose, Muslims in one city, though scattered in the whole city yet, are mainly located in two areas where the Muslims of lower and middle classes engaged in traditional occupations dominate. Taking a sample of Muslims only from these two areas for the study will be a biased sample in which upper -class highly educated Muslims engaged in upper class status services may not be represented at all.

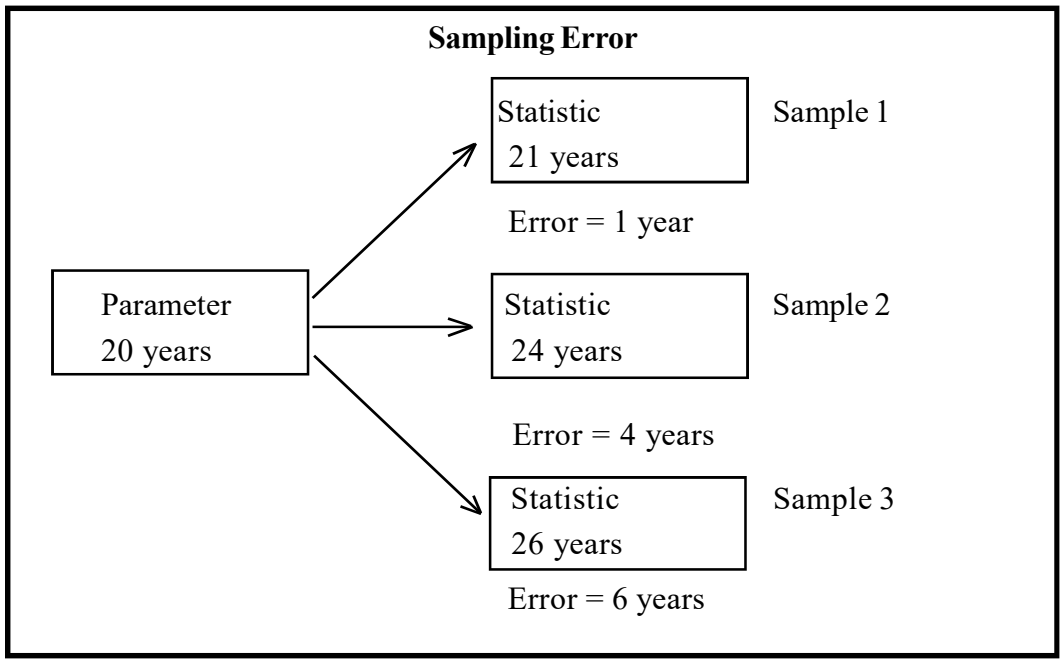
Parameters :

Characteristics of a population are called parameters. According to Sanders and Pinchey a parameter is the summary description of variable for a population. Suppose we want to determine the average age of eight students. We add the ages of all the eight students and dividing them by the number of

cases (8) which equals to 20, we determine the parameter of 'young age'. Since we seldom know the parameters of populations, we estimate them using data from samples. In the above example thus, a parameter would be the average age of all students of a college at some specified time. Whereas a parameter represents a summary description of population, a statistic represents a summary description of the sample.

Sampling Error :

It is the difference between total population value and the sampling value, or, it may said that it is the degree to which the sample be characteristics approximate the "characteristics of the total population". Suppose one parameter of the population pertaining to age is that average age is 20 years. Now, suppose, we have drawn three samples from that population and have calculated the average age of these samples. In the first sample, the average age is 21 years, in the second, it is 24 years and in the third is 26 years. Thus, the sampling error in the first sample would be one year, in the second sample would be four years, and in the third would be six years.



Thus, sampling error is neither a measurement error nor it is a systematic bias in sample. It is the error which depends on the representativeness of the sample. The less the sampling error, the greater the precision of the sample. In October 1999 parliamentary elections, three different organisations conducted an exit poll. Each organisation gave different figures regarding the number of seats which the BJP and allies, the congress and allies and the third group were likely to get the actual number of seats won (out of 537) was BJP and allies: 304, Congress and allies, 134, and the third group: 99. The error was that persons selected for opinion did not represent the total voters.

Perfectly representative sample depends on two factors.

(i) sampling error; and

(ii) non-sampling error, also called systematic error.

While sampling error is a function of sample size, systematic error is the result of non-sampling factors like study design, correctness of execution sample frame errors (list of population from which a sample is taken), random sampling error (difference between total population value and sample value) and non-response error. Thus, random sampling error and systematic error associated with the sampling process may combine to yield a sample that is less than perfectly representative of the population.

11.4 TYPES OF SAMPLING:

There are basically two types of sampling:

Probability sampling and non-probability sampling.

Probability sampling is one in which every unit of the population has an equal probability of being selected for the sample. It offers a high degree of representativeness. However, this method is expensive, time consuming and relatively complicated since it requires a large sample size and the units

selected are usually widely scattered. Non-probability sampling makes no claims for representativeness, as every unit does not get the chance of being selected. It is the researcher who decides which sample units should be chosen.

PROBABILITY SAMPLING

Probability sampling today remains the primary method for selecting large, representative samples for social science and business researches. According to Black and Champion, the probability sampling requires following conditions to be satisfied:

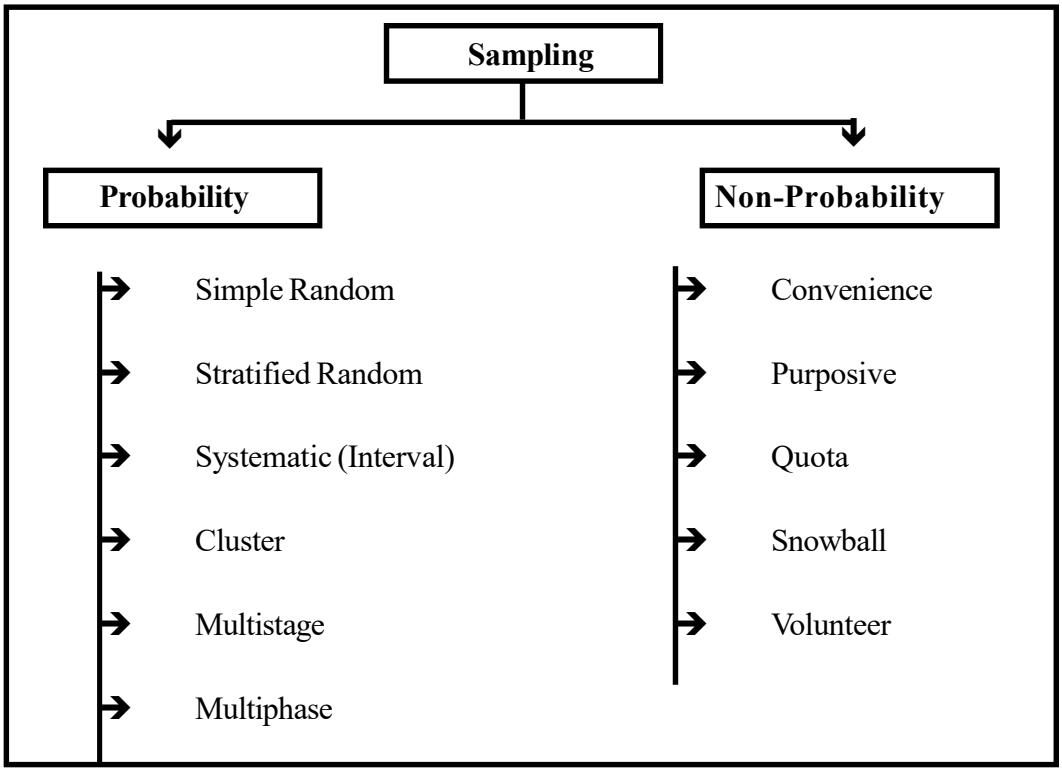
1. Complete list of subjects to be studied is available;
2. Size of the universe must be known;
3. desired sample size must be specified, and
4. each element must have an equal chance of being selected.

The six forms of probability sampling are: Simple random, Stratified random, systematic (or interval), cluster, multi-stage and Multi-phase.

NON-PROBABILITY SAMPLING:

In many research situations, particularly those where there is no list of persons to be studied (e.g., wife battering, widows, Maruti Car owners, consumers of a particular type of detergent powder, alcoholics, students and teachers who cut classes frequently, migrant workers and so on), probability sampling is difficult and inappropriate to use. In such researches, non-probability sampling is the most appropriate one.

Non-probability sampling procedures do not employ the rules of probability theory, do not claim representativeness and are usually for qualitative exploratory analysis. The five types of non-probability sampling are: convenience, purposive, quota, snowball and volunteer.



11.5 PROBABILITY SAMPLE

Different types of Probability Sampling

11.5.1 Simple random sampling:

In this sampling, the sample units are selected by means of a number of methods like lottery method, pricking blind foldedly, Tippet's tables, computer, personal identification (PIN) or by first letter.

a) Lottery method :

This method involves three steps. First step is constructing the sampling frame, i.e. a list of the units of the target population, e.g. students' list, the electoral role in alphabetical order and numbered accordingly. Second step is writing numbers listed in the sampling frame on small pieces of paper and placing these papers in some vessel/jar etc. Third

step is mixing all papers well and taking out one piece of paper from the Jar. This process is continued until the required number of respondents is reached. For example, 100 houses are to be allotted to applicants out of 2,500 houses constructed. Here 2,500 pieces of papers numbered from 1 to 2,500 are put in a drum and mixed and some eminent person or some child is invited to take out 100 slips from the drum. If the number on the piece of paper is 535, the name on the list that corresponds to that number is identified and recorded. Thus, 100 numbers selected will be allottees of houses.

(b) Tippet's table or random numbers method:

Tippet has prepared a table of random numbers (of one to five digits each). These numbers are available in various forms, sizes and number combinations in the appendix of the texts on statistics. To understand this lets take an example. Two hundred teachers employed by seven English medium pre-primary schools in the city apply for attending a two day seminar. The sponsors, however, only had money to pay for 30 participants. The seminar director, therefore, assigned each applicant a number from 001 to 200, using a table of random numbers that he found in a statistics text book. He selected 30 names by moving down columns of 3 digit random numbers and taking the first 30 number within the range of 001 to 200. The director decided that this method was easier than picking up numbers from the urn.

The Advantages of simple random sampling are :

1. All elements have equal chance of being included.
2. It is the simplest of all sampling methods and easiest to conduct.
3. This method can be used in conjuction with other methods in probability sampling.
4. Researcher does not need to know the true composition of the population before hand i.e. he requires maximum knowledge of

population in advance.

5. Degree of sampling error is low.

6. Most statistical textbooks have easy to use tables for drawing a random sample.

The disadvantages of simple random sampling are :

1. It does not make use of knowledge of population which researcher may have.

2. It produces greater errors in the results than do other sampling methods.

3. It cannot be used if the researcher wants to break respondents into sub-groups or strata for comparison.

11.5.2 Stratified Random Sampling :

This is the form of sampling in which the population is divided into a number of strata or sub-groups and a sample is drawn from each stratum. These sub-samples make up the final sample of the study. It is defined as "the method involving dividing the population in homogeneous strata and then selecting simple random samples from each of the stratum." The division of the population into homogeneous strata is based on one or more criteria, e.g. sex, age, class, educational level, residential background, family type, religion, occupation and so on. Stratification does not involve ranking. There are two types of stratified sampling i) proportionate and (ii) disproportionate. The former is one in which the sample unit is proportionate to the size of the sampling unit, while the latter is one in which the sample unit is not related to the units of the target population. Here is an example: suppose population of 1,000 persons is stratified in five groups on the basis of religion and each group consists of the following number of persons. Hindu-500, Jain- 200, Sikh - 150, Muslim - 100 and other 50.

Proportionate sample would be:

5	-	4	-	3	-	2	-	1	
↓		↓		↓		↓		↓	
1		2		3		4		10	= 20

Disproportionate sample would be:

5	-	4	-	3	-	2	-	1	
↓		↓		↓		↓		↓	
4		4		4		4		4	= 20

As a general rule, it is wise to use proportionate stratified sample.

The advantages of stratified random sampling are:

- Sample chosen can represent various groups and patterns of characteristics in the desired proportions.
- It can be used for comparing sub-categories.
- It can be more precise than simple random sampling.

The disadvantages of stratified random sampling are:

- It requires more efforts than simple random sampling.
- It needs a larger sample size than simple random sample to produce statistically meaningful results because each strata must have at least 20 persons to make statistical comparisons meaningful.

11.5.3 Systematic (or Interval) Sampling:

This sampling is obtaining a collection of elements by drawing every n^{th} person from a pre-determined list of persons. In single words, it is randomly selecting the first respondent and then every nth person after that, 'n' is a number termed as sampling interval. When the sampling fraction method is employed, samples are drawn from a sampling frame on the basis of the sampling fraction that is equal to N/n, where N is the member of units in the target population and 'n' the number of

units of the sample.

Systematic sampling differs from simple random sampling in that in the latter, the selections are independent of each other; in the former the selection of sample units is dependent on the selection of a previous one.

The advantages of systematic sampling are:-

- It is easy and simple to use:
- It is rapid method and eliminates several steps otherwise taken in probability sampling and
- mistakes in drawing elements are relatively unimportant.

The disadvantages of this sampling are:

- It ignores all persons between two n^{th} numbers with the result that the possibility of over representation and under representation of several groups is greater.
- Since each element has no chance of being selected, it is not probability random sampling as has been pointed out by Black and champion.

11.5.4 Cluster Sampling

This sampling implies dividing population into clusters and drawing random sample either from all clusters or selected clusters. This method is used when

a) cluster criteria are significant for the study, and

(b) economic considerations are significant . Initial clusters are called primary sampling units; clusters within the primary clusters are called secondary sampling units; and clusters within the secondary clusters are called unit stage clusters. Where clusters are geographic units, it is called area sampling. For example, dividing one city into various wards, each ward into areas, each area into each neighbourhood and each neighbourhood into lanes.

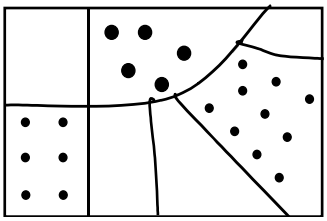
We can take an example of a hospital, The issue is to ascertain the problem faced by doctors, patients and visitors in different units and to introduce some reformative programmes. Administratively, it will not be viable to call all doctors from all units nor a large number of patients admitted in different units like cardiology, neurology orthopaedic and so on. Treating each unit as a cluster, randomly selected doctors and patients say two doctors and three patients or about 50 people all together from all units may be invited for discussions.

The advantages of cluster sampling are.

- It is much easier to apply this sample when large population are studied or when large geographical area is studied.
- Cost in this method is much less than in other methods of sampling.
- Respondents can be readily substituted for other respondents
- Flexibility is possible.
- Characteristics of cluster can be estimated.
- It is administratively simple, since no identification of individuals is necessary, and
- It can be used when it is inconvenient or unethical to randomly select individuals.

The Disadvantages of this sampling are :

- Each cluster is not of equal in selection of one district from one state, or one village from one block. The district or village can be small, intermediate or large sized.
- Sampling error is greater.
- Some individual can belong to two clusters and studied twice.
- It lacks representation ; and
- there could be homogeneity in one cluster but heterogeneity in other



Cluster Sample

11.5.5 Multi Stage Sampling :

In this method, sampling is selected in various stages but only the last sample of subjects is studied. For example, for studying the panchayat system in villages, India is divided into zones (four zones), one state is selected from each zone, one district is selected from each state, one block is selected from each district and three villages are selected from each block. This will help in comparing the functioning of panchayat in different parts of India. Sampling in each stage will be random but it can also be deliberate or purposive, thus, multi stage sampling according to Ackoff can be combination of (i) simple + simple sampling (ii) sample + systematic (interval) sampling and (iii) systematic & systematic sampling.

Let us take one example. Suppose bank employees are to be studied in one city for assessing their views on introducing reforms in banks, including use of computers. The names of all Managers, accountants and senior clerks in all banks will be typed in the first stage. Suppose these names are typed in 100 pages, each page containing 20 names alphabetically. Out of 2,000 bank personnel, we have to take out a sample of 50 persons. We can do this first by taking out every tenth page (out of 100 pages) i.e. 10 pages and from each page, we take out every fourth name (i.e. five bank employee from one page). This will be the example of systematic plus systematic sample. The attenative is take first 10 pages and select any one page at random. In this way select 10 pages out of 100 pages. From each page select any five names at random. This will be simple plus simple random sampling. The main advantage in the sampling will be that it will be more representative. Other advantage is that in all cases, complete listing of population is not necessary. This saves cost.

11.5.6 Multi Phase Sampling :

The process in this type of sampling is same as in multi stage sampling i.e. primary selection, secondary selection and so on. However, in a multiphase sampling procedure, each sample is adequately studied before another sample is drawn from it. Consequently, while in multi stage sampling, only the final sample is studied, in multiple phase sampling, all samples are researched. This offers an advantage over other methods because the information gathered at each phase helps the researcher to choose a more relevant and more representative sample. We can take an example. We are interested in studying MBA students in one city. Suppose there are five institutions imparting MBA education and in each institution there are 30 students. Thus, firstly, the sampling frame of MBA students in five institutions will be constructed.

These respondents will be studied with regard to their academic background, whether they are first second divisioners. Of there 150 students, 50 will be selected randomly; after selecting these 50 students, 25 girls and 25 boys will be chosen. This sample will be the final sample for the study.

CHECK YOUR PROGRESS

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

(A) What do you understand by the following terms

i) Universe

ii) Sample

iii) Sampling unit

iv) Sampling Frame

11.6 LET US SUM UP

Thus it can be Semniarize that A sample is a portion of people drawn from a larger population. It saves our time and money and achieves greater response rate.

Probability Sampling consists of multistage, multiphase, stratified, cluster sampling etc.

11.7 SUGGESTED READINGS

(1) Black James A. and Dean J. Champion, Methods and Issues in social research, John Wiley, New York, 1976.

(2) Manheim, Henry, Sociological Research. Philosophy and Methods The Porsey press, Illinois,1977.

(3) Babbie, Earl, The practices of social research (8th ed). Nadswarth Publishing Co. Albany, New York, 1998.

11.8 ANSWERS TO CHECK YOUR PROGRESS

i) The sum total or aggregate of all units.

ii) It is portion of total population.

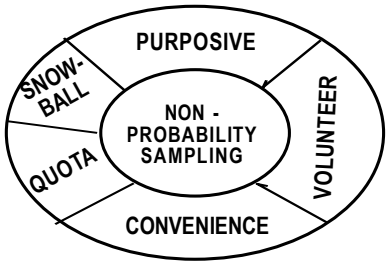
iii) Each entity from the population about which information is collected.

iv) Single member or collection of member subject to date analysis.

NON-PROBABILITY SAMPLING-ACCIDENTAL, QUOTA AND PURPOSIVE SAMPLING

12.1 INTRODUCTION

As stated in the earlier lesson, sampling is mainly of two types probability and non-probability sampling. We have already understood probability sampling and its types in detail. In this chapter we will make an attempt to understand Non-probability sampling and its various forms. The five types of non-probability sampling include convenience, purposive, quota, snowball and volunteer.



12.2 OBJECTIVES

In this lesson you will learn

i) Non Probability Sampling

ii) It's various Types

12.3 CONVENIENCES SAMPLING :

This is also known as 'accidental or 'haphazard' sampling. In this sampling, the researcher studies all those persons who are most conveniently available or who accidentally come in his contact during a certain period of time in the research. For example, the researcher engaged in the study of university students might visit the university canteen, library, some departments, play grounds, verandahs and interviews certain number of students. Another example is of election study. During election times, Media personnel often present man on the street interviews that are presumed to reflect public opinion. In such sampling, representativeness is not significant.

The most obvious advantage of convenience sample is that it is quick and economical. But it may be a very biased sample. The possible sources of bias could be

(1) The respondent may have a vested interest to serve in cooperating with the interviewer, and

(2) the respondents may be those who are vocal and want to brag

Convenience samples are best utilised for exploratory research when additional research will subsequently be conducted with a probability sample.

12.4 PURPOSIVE SAMPLING :

In this sampling which is also known as judgemental sampling, the researcher purposely chooses persons who, in his judgement about some appropriate characteristic required of the sample members, are thought to be relevant to the research topic and are easily available to him. For example, the researcher wants to study beggars. He knows three areas in the city where the beggars are found in abundance. He will visit only these three areas and interview beggars of his choice and convenience. The manufacturers (of cosmetics, oils, garments, etc.) select test market cities because they are viewed as typical cities with demographic profiles closely matching the national profile. Popular journals conduct surveys in selected meboysolitain cities to asses the popularity of politicians and political parties or to forecast election results. Thus, in this technique, some variables are given importance and it represents the universe but the selection of units is deliberate and based on prior judgement

12.5 QUOTA SAMPLING

This is a version of satisfy sampling with the difference that instead of dividing the population into strata and randomly choosing the respondents, it works on quotas, fixed by the researcher. In the examples of studying 50 MBA students from 150 students in five institutions the researcher fixes the quota of 10 students from each institution, out of which five will be boys and five girls. The choice of the respondents is left to the interviewer . Determining quotas depends on a number of factors related to the nature and type of research. For instance, the researcher might decide to interview three boys out of five boys from final year and two from previous year, or two studying the morning course and three studying the evening course.

Quota can also be fixed according to their proportion in the entire population. For instance, for studying the attributed of persons towards use of loudspeakers in religious places in one educational institution with 100 males and 50 females belonging to different religions, quota can be fixed in the of one female for every two males.

Further quota may be fixed on the basis of number of persons in each of the three religious groups.

Males			Females		
Hindu	Muslims	Others	Hindu	Muslims	Others
80	10	10	35	10	5
16	12	2	7	2	1
	↓			↓	
	20			10	

The advantages of quota sampling are :

(1) It is less costly than other techniques.

(2) It does not require sampling frames.

(3) It is relatively effective

(4) It can be completed in a very short period of time.

Its Disadvantages are :

(1) It is not representative

(2) It has interviewers bias in the selection

(3) Estimating sampling error is not possible

(4) Strict control of fieldwork is difficult (instead of 25 only 20 respondents may be available)

12.6 SNOWBALL SAMPLING

In this technique, the researcher begins the research with the few respondents who are known and are available to him. Subsequently these respondents give other names who meet the criteria of research, who in turn give more new names. This process is continued until, adequate, number of persons are interviewer or until no more respondents are discovered. For instance in studying wife battering, the researcher may first interview those cases whom he knows, who may later on give additional names, and who in turn may give still more names. This method is employed when the target population is unknown or when it is difficult to approach the respondents in any other way. Reduced sample sizes and costs are a clear advantage of snowball sampling. Bias enters because

a person known to someone has a high probability of being similar to the first person. If there are major differences between those who are widely known by others and those who are not, there may be serious problems with snowball sampling.

12.7 VOLUNTEER SAMPLING

This is the technique in which the respondent himself volunteers to give information he holds.

Bias in selecting Informants in Non-Probability sampling :

The success of the research is dependent on the 'rich' information given by the respondents. Many a time, the leading informants selected by the researcher are those who do not have much and appropriate information on the topic under study and who are unwilling to cooperate and respond. The researcher's bias in selecting the leading subjects is evident in the following cases;

1. The researcher has no knowledge or little knowledge of the social setting of the research. For example, the researcher who wants to study informal social networks in a village or a factory or a university etc. has to locate individuals who could understand what he was looking for and help him in finding it. With little or no knowledge of the situation location of research, the researcher cannot find such potential informants who have a wider range of interactions.

2. The informants do not represent the population i.e. they do not have the aggregate characteristics in the population.

3. They are not 'typical' in the sense that their observations and opinions may be misleading. The a typical or marginal informants within their group will not-provide adequate information.

4. They are unwilling to be helpful and cooperative.

5. They are activists in a 'particular' group because of which they do not present the viewpoints of 'other' groups

6. They belong to the community under investigation only marginally and this marginality is bound to bias their views.

7. Selecting informants who are convenient for study

8. Personal learnings of the researcher of being prejudiced against certain types of persons say untouchables, non-Hindus, shabbily dressed persons, too fashionable women and so forth.

Sample Size :

Considerations in sample size:

A question is often asked how many persons should be included in the sample, i.e. how large or small must the sample be to be representative?. Some people say, the most common size is one tenth of the total population. Some other say that a minimum of 100 subjects is required to allow statistical inferences. However, these estimates are not always correct. The sample size has to be based on the following considerations.

1. **The size of the population :** i.e. whether the total population to be studied is very large, large or small

2. **Nature of population :** i.e. whether the population is homogenous or heterogenous. In the former, a small sample may suffice but in the latter, a larger sample is required.

3. **Purpose of study** i.e. whether the study is descriptive exploratory or explanatory.

4. **Whether the study is qualitative or quantitative :** In qualitative studies sampling does not resort to numerical boundaries to determine the size of sample. Similarly, when purposive or accidental sampling are employed, the researcher himself, can decide the 'sufficient' number of respondents. In such cases; generalisations are concerned with quality rather than with quantity.

5. **Accessibility of the elements :** Many a time it is difficult to contact respondents at time and place convenient to the researchers

6. **Cost of obtaining elements :** With more resources an adequate number of investigators can be appointed and a large sample may be considered.

7. **Variability required :** Sometimes the respondent require to have persons of

different groups e.g. of different age, different income, different educational background, different occupations and so on.

8. Desired accuracy or confidence level for high degree of accuracy, a large sample need to be drawn. One has a think of the level at which one will be confident that his sample is representative.

9. Sampling error or desired risk level. The minimum sample error, maximum will be the sample's representations.

10. Stratification i.e. how many times the sample has to be sub-divided during the data analysis. This is to ensure an adequate size for each sub-division.

12.8 LET US SUM UP

Sampling is an important step in the research proves. With the help of sampling it is possible to achieve dependable and reliable results with less cost and in comparatively manageable time with small administrative and organisational set up. Non Probability Sampling snowball, quota Volunteer, Convenience Sampling etc.

Check Your Progress :-

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

Q.1. What is non-probability sampling. Explain its various types?

_____

_____

Q.2. Write a short note :-

(i) Convenience sampling

_____

_____

12.9 SUGGESTED READINGS

(1) Black James A. and Dean J. Champion, Methods and Issues in social research, John Wiley, New York, 1976.

(2) Manheim, Henry, Sociological Research. Philosophy and Methods The Porsey press, Illinois,1977.

(3) Babbie, Earl, The practices of social research (8th ed). Nadswarth Publishing Co. Albany, New York, 1998.

12.10 ANSWERS TO CHECK YOUR PROGRESS

i) Non Probability sampling is the one in which these are list of persons to be studied like convenience, Quota, Snowball etc.

ii) In this sampling, the researcher studies the persons who are conveniently available.

DATA : PRIMARY & SECONDARY

STRUCTURE

13.1 INTRODUCTION

The task of data collection begins after a research problem has been defined & research design chalked out. While deciding about the method of data collection to be used for the study, the researcher should keep in mind two types of data viz., Primary and Secondary.

The Primary data are those which are collected a fresh and for the first time, and thus happen to be original in character. The secondary data, on the other hand, are those which have already been collected by some one else and which have already been passed through statistical process. The researcher would have to decide which sort of data he would be using for his study and accordingly he will have to select one or the other method of data collection. The methods of collecting primary and secondary data differ since primary data are to be originally collected, while in case of secondary data the nature of data collection work is merely that of compilation.

13.2 OBJECTIVES

In this lesson, you will learn

i) Meaning of Social survey

ii) Forms of Social Survey

iii) Primary and Secondary Data

iv) Questionaire and Schedule Method

13.3 SOCIAL SURVEY

The world social survey was firstly used bh heredities during 300 B-C for population study in Egypt. Secondly it was used John Howard for prisons and prisoners in Wales and England. French reformers also undertaken it for the conditions of workers after

industrialization Row tree used for economic conditions in U.S.A. in 1936 and 1988. Shelley Harrison used for interconnected social problems in 1914. The word survey has been derived from two Latin words Sur which means over and Veeir means looking. Combining both Surveeir means over looking for something. If you've ever been sitting at a train station, a particular lecturer's classroom, or in a public area and a person with a stack of papers in his hands comes up to you out of the blue and asks if you have a few minutes to talk, then you have likely been asked to take part in a survey.

There are a lot of ways to conduct research and collect information, but one way that makes it really easy is by doing a survey. A **survey** is defined as a brief interview or discussion with individuals about a specific topic. The term survey is, unfortunately, a little vague, so we need to define it better. The term survey is often used to mean 'collect information.'

So, besides our definition above, survey also means to collect information. We have our first definition of a brief interview and we have a second definition of collecting data. There is a third definition for survey. This third definition of survey is a specific type of survey research. Here are the three specific techniques of survey research :

- **Questionnaires -** a series of written questions a participant answers. This method gathers responses to questions that are essay or agree / neutral / disagree style.
- **Interviews -** questions posed to an individual to obtain information about him or her. This type of survey is like a job interview, with one person asking another a load of questions.
- **Surveys -** brief interviews and discussions with individuals about a specific topic. Yes, survey is also a specific of survey, to make things even more confusing. A survey is a quick interview, with the surveyor asking only a few questions.

13.4 DEFINITION OF SURVEY METHOD

Following are the definitions of social survey method of a data collection.

1. **Bogardus :** Social survey is the collection of data concerning the living and working conditions of a community's people.

2. **E. W. Burgess :** It is the scientific study of conditions and needs of community for presenting a constructive programme of social advance.

3. **Mark Abram :** Social Survey is a process by which quantitative facts collected about the social aspect of community.

13.5 SOME MAIN FORMS OF SOCIAL SURVEYS

Depending upon the purpose and the nature of the study, social surveys assume different forms like :

1. Official, semi-official or private surveys
2. Widespread or limited surveys
3. Census surveys or sample surveys
4. General or specialized surveys
5. Postal or personal surveys
6. Public or confidential surveys
7. Initial or repetitive surveys
8. Regional or adhoc surveys

13.6 COLLECTION OF PRIMARY DATA

We collect primary data during the course of doing experiments in an experimental research but in case we do research of the descriptive type and perform surveys, whether sample surveys or census surveys, then we can obtain primary data either through observation or through direct communication with respondents in one form or another or through personal interviews. This, is other words, means that there are several methods of collecting primary data, particularly in surveys and descriptive researches. Important ones are :

(i) Observation method

(ii) Interview method

(iii) Through Questionnaires

(iv) Through schedules etc.

13.7 OBSERVATION METHOD

The observation method is the most commonly used method specially in studies relating to behavioural sciences. In a way one observe things around them. Observation becomes a scientific tool and the method of data collection for the researcher, when it serves a formulated research purpose, is systematically planned and recorded and is subjected to checks and controls on validity and reliability. Under the observation method, the information is sought by way of investigators own direct observation without asking from the respondent. There are several types of observations some more popular than others e.g. participant and non-participant, structured and unstructured etc. (A detailed description of this method can be seen in the next following chapters)

13.8 INTERVIEW METHOD

The interview method is a kind of verbal technique for obtaining data. Together with questionnaires, interviews make up the survey method , which is one of the most popular techniques of social research. It is a direct method of data collection.

There are many types of interview, each of which differ from others in structure, purpose, role of interviewer, number of respondents etc.

(A detailed description is given the following chapters).

13.9 QUESTIONNAIRES & SCHEDULES

Questionnaire is the structured set of question usually sent by mail, though sometimes it is delivered by hand also. A questionnaire method is that method in which a number of printed questions is used for collecting data. This list of questions is sent by mail to the respondents. After filling up the questionnaire they return it to the investigator.

A schedule, whereas, is also a list of questions, which helps to collect data, but in this method the investigator himself presents the questionnaire to the

individuals whose responses are needed. Both questionnaires and schedules are very similar, but they also differ in some respects. A questionnaire is sent to the respondents by mail, whereas a schedule is used directly in interviews (A detailed description is given in the next following chapters)

13.10 SOURCES OF SECONDARY DATA

Data are collected for a number of reasons and much of these data are available to social work researchers. First of all, a major source of statistical data is central state and local governments that collect data for either administrative purpose or for the purpose of periodical evaluation of their programmes or services. Various ministries like HRD, Labour and Employment and Rural Development, as well as Municipal corporations are repositories of vast amount of secondary data.

The NGO's that collect data as required by the funding agencies in the form of need assessment, programme planning and evaluation of programmes/services for clients services are yet another source of secondary data.

Content analysis is yet another method of analyzing secondary data such as field records, articles published in journals or newspapers, diaries etc. It consists basically of coding, tabulating and analyzing of content of data obtained through secondary sources. The various steps are involved in the process for content analysis which are as follows :-

1) Selection of topic to be analyzed.

2) Selecting the media from which data are to be analyzed

3) Constructing a coding scheme.

4) Deciding the sampling plan.

5) Deciding the coders reliability

6) Analysis of data

13.11 SIGNIFICANCE OF SECONDARY DATA

The primary data collected by one person may become the secondary data to another. The census survey conducted by the government of India once in 10 years collects primary data about the people of the country. But the same statistics will become secondary data to anyone else. There are certain distinct advantages of and limitations to using secondary data.

13.12 ADVANTAGES OF SECONDARY DATA

The various advantages of using secondary data are the following.

1) It is highly economical as less expenditure is incurred in the collection of secondary data.

2) The secondary data facilitates the researcher to complete the research project promptly, since he need not spend much of his time in collecting data.

3) The secondary data helps the researcher to formulate the research problem. The secondary data enable the researcher as well to prepare the tool of data collection and formulate hypothesis for the study.

4) The researcher could find research gap in the area of study with the help of the secondary data. The review of literature helps him to select the problem for investigation.

5) Finally, secondary data can be used as a basis for comparison with the primary data that the researcher has just collected.

13.13 LIMITATIONS OF SECONDARY DATA0

1) It is very difficult to assess the accuracy of the secondary data. It is also difficult to know with what care secondary data have been collected and tabulated.

2) A severe limitation in the use of secondary data is that they may be somewhat out of date. A good deal of time is spent in the collection, processing, tabulation and publishing of these data. By the time data are made available to the researcher they may have become out dated due to excessive time consumed in their collection.

3) Finally, the secondary data are not available to the researcher in the form he wants to have.

CHECK YOUR PROGRESS

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

1. What are different methods of data collection?

_____

_____

2. What are the various sources of secondary data?

_____

_____

13.14 LET US SUM UP

Thus, it can be sum marize that the researcher would have to decide which sort of data he would be using for his study and accordingly he will have to select one or other method of data collection.

13.15 SUGGESTED READINGS

1. C.R. Kothari (2001) Research Methodology, Methods and Techniques.

2.	Black and Champion (1976)	Methods and Issues in Social Research.
3.	Kerlinger F.N. (1973)	Foundations of Behavioural Research.
4.	P.V. Young (1969)	Scientific Social Surveys & Research
5.	Cohen and Nagal (1984)	An Introduction to Logic and Scientific Method.

13.16 ANSWERS TO CHECK YOUR PROGRESS

i) The different methods of data collection are :

Question aire, Schedule, Interview etc.

ii) The various sources of secondary, data are :

Content Analysis, NGO's, Media both electronic and print etc.

*****

OBSERVATION-PARTICIPATORY AND NON-PARTICIPATORY

STRUCTURE

14.1 INTRODUCTION

Observation is one of the oldest methods of data collection. Until it was introduced to sociology it was largely employed by social anthropologists and ethnologists, with sociologists and other social scientists opting in larger numbers for survey and other techniques.

Literally, observation means a method of data collection that employs vision as its main means of data collection. It is used as the only technique of data collection or jointly with other techniques for instance in intensive interviewing, documentary study or case studies. Observation is an indirect method of data collection since in most cases it collects information without the full knowledge of the respondent. Often, even if the respondent knows that he or she is being observed, the actual nature and purpose of observation are not known.

14.2 OBJECTIVES

In this lesson you will be able to learn

i) Meaning of observation

ii) Types of observation

iii) Purposes of observation

iv) Advantages of observation

14.3 TYPES OF OBSERVATION

Observation is open to all observable social phenomena. However, there are some limitations. In the first place there are issues that do not end themselves to an observational analysis e.g., personal, sensitive issue or causes and consequences of social phenomena.

Further, observation is limited by the fact that it can only study observable phenomena.

There are several types of observations some more popular than others. Although basically similar, they do differ from each other in the degree of the observer's participation

in the environment, in the setting in which it occur, and in the manner in which it is organised. Some examples of observation are given below.

14.3.1 Naive and Scientific Observation

Naive observation refers to every day, unstructured observation which people use when they interact with others in social situations. Observation becomes scientific when it is systematically planned and executed, when it is related to a certain goal and when it is subjected to a certain goal and when it is subjected to tests and controls.

14.3.2. Participant and Non-participant Observation :

In general, the degree of observer's involvement in observation varies from no participation at all to full participation.

Participant observation is a method in which the investigator becomes a part of the situation he is studying. He involves himself in the setting and group life of the research subjects. He shares the activities of the community, observing what is going on around him, supplementing this by conversations and interview. Participant observation is more used in anthsopological research while non-participant in sociological research. In India, M.N. Srinivas had used this method in studying the process of Sankritisation in Mysore while Andre Beteille had used it to study social inequality in rural areas (Tanjore village) on the basis of class, status and power. Some American sociologists have also used it for studying some groups of individuals like professional thieves, homosexual, alcoholic, hippies drug uses and institutions like hospitals, industries, schools, asylums etc.

In a qualitative research participant observation must have the following characteristics

1) Studying everyday life events as experienced and understood by the participants

2) Communicating with participants through interaction and perceiving reality as it is.

3) Event to be studied in natural environment of the participants.

The weakness in this type (participant) of observation are :-

(i) Since the observer participates in events, sometimes he be comes so involved that he loose objectivity in observation.

(ii) He influence the events.

(iii) He interpret events subjectively

(iv) His presence sensitive the subjects that they do not act in a natural way.

(v) He may record some information but may fail to record other information as well as to explain reasons why information was not recorded.

(vi) Since he fails to specify the procedures for gathering information, others cannot replicate his research findings for verification and validity.

(vii) He fails to be precise about the procedures for data collection.

(viii) There is less attention to precision and.

(ix) This method cannot be used for studies where people indulge in illegal activities.

In non-participant observation, the observer remains detached and does not participate or intervene in the activities of those who are being observed. He merely observes their behaviour. Sometimes this places the persons being observed in an awkward position and their conduct becomes unnatural. But some say though initially the observer's behaviour may affect the behaviour of the observed but after a little while, less and less attention is paid to his presence. This type of observation is more useful as a tool of data collection because the observer can choose the situations to be observed and can record the data freely.

14.3.3. Structured and Unstructured Observation:

These two types of observation differ in terms of the degree to which they are structured. Structured observation employs a formal and strictly organised procedure, with a set of well-defined observation categories and is subjected to high levels of control and differentiation. It is organised and planned before the study begins. Unstructured observation is loosely organised and the process of observation is largely left up to the observer to define.

Semi-structured observations lie somewhere between these two techniques and may be structured, for instance, in their approach but unstructured in their setting. They are relatively common in social research and combine advantages (and limitations) of both the structured and unstructured technique of observation.

14.3.4. Natural and Laboratory Observations:

The main difference between these two techniques lies in the type of setting in which they unfold. In the former, observations take place in natural settings; in the latter they are performed in a laboratory.

14.3.5. Open and Hidden Observation:

This distinction refers to the degree to which the identity of the researcher as an observer as well as the purpose of the study is known to the participants. While in the case of open observation the participants are well informed of the nature of the study and the identity of the researcher, in hidden observation they are not.

14.3.6. Active and Passive Observation:

This type of observation refers to the degree to which the observer is involved in the process and purpose of observation. Active observation presupposes full engagement of the observer in the cause of the study, while passive observation sees the role of the observer as being just a strict recording of data. In this case observation is a job to be done in an objective neutral fashion.

14.3.7. Direct and Indirect Observation :

Direct observation studies the subject it intends to explain e.g. if the study intends to explain the patterns of conflict in marital dyads and observation involves married couples, this is a direct observation. Indirect observation does not involve the object of study, either

because the subject refuses to take part in the study or a direct observation is not possible. Instead, researchers observe the physical traces the phenomena under study have left behind and make conclusions about the subject.

14.3.8. Covert and Overt Observation :

In covert observation, subjects are unaware that they are being observed. Generally, the researcher in this type of observation is himself a participant in all the activities, otherwise it becomes difficult for him to explain his presence. These observations are mostly unstructured. In overt observation subjects are aware that they are being observed. Sometimes this causes them to act differently than they do normally e.g. if a policeman in a police station knows that his behaviour is being watched by a researcher, he will never think of using third-degree methods in dealing with the accused person, rather he would show that he is polite and sympathetic.

Types of Observation

Type of Observation	Basis of Classification	Sub types
1. Participant/ Non participat	Becoming part of situation or remaining detached	**Participant :** Observer involves himself in setting and shares activities of the observed. **Non-Participant :** Observer remains passive.
2. Systematic/ Unsystematic	Data's ability to generate useful information.	**Systematic :** Rules followed and replication possible. **Unsystematic:**No rules followed and no replication possible.
3.Naive/Scientific	Planning	**Naive :** Unplanned **Scientific** : Planned
4.Structured/ Unstructured	Procedure and Control	**Structured :** Employs formal procedure and high controls.
	Setting for observation.	**Unstructured :** Loosely organised. **Natural :** Study in natural setting.

Type of Observation	Basis of Classification	Sub types
5.Natural/Laboratory	Knowledge of Research goals	**Laboratory :** Study in artificial setting.
6.Open/Hidden		**Open :** Objects of research and researcher's identity known.
		Hidden : Purpose of study and researchers identity not known.
	Directly observing phenomenon/event/subjects	**Direct :** Phenomena/event/subjects directly observed.
7. Direct/Indirect	or only left behind traces observed.	**Indirect :** Only left behind physical traces of phenomenon observed.
	Knowledge of being observed	**Covert :** Subjects unaware of being observed.
8. Covert/Overt		**Overt :** Subjects aware of being observed.

14.4 PURPOSES OF OBSERVATION

The major purposes of observation as described by Black and Champion (1976:332) are as under:

1) To capture human conduct as it actually happens. In other methods, we get a state comprehension of people's activity. In actual situation, they sometimes modify their views, sometimes contradict themselves, and sometimes are so swayed away by the situation that they reach differently altogether, e.g. clerks behaviour in office, tone of voice, facial expressions and content of slogans by the demonstrators.

2) To provide more graphic description of social life than can be acquired in other ways e.g. how do women behave when they are physically assaulted by their husbands? How do young widows behave when they are humiliated, harassed and exploited by the in-laws? How are bonded labourers treated by their landlords?

3) To explore important events and situations. There are many instances when little is known about the topic issue. By being on the scene, issues that might otherwise be overlooked are examined more carefully e.g. visiting office soon after the office hours and finding that the married men and single women were working overtime and single men and married women had gone home.

4) It can be used as a tool of collecting information in situations where methods other than observation cannot prove to be useful, e.g. workers behaviour during strike.

14.5 PROCESS OF OBSERVATION

a) **Steps in Observation :** Observation takes place in the same form as the general research model. Nevertheless, the content of each step includes elements that are more or less influenced by the nature of observation. The following is a brief summary of the basic steps of research as employed in the area of observation, mainly by quantitative researchers. Qualitative investigators may use the same steps but their content will have to be adjusted to the principles of the underlying theoretical frame work.

Step 1: Selection of the topic

This step entails the selection of a theoretical approach and the issue to be studied through observation. This must be an observable social phenomenon at any level.

Step 2: Formulation of the topic

This involves a specific definition of the topic; exploration of its elements and structure; development of observation categories; establishment of the observer subject relationship; and explanation of what is to be observed, where required.

Step 3: Research Design

Here, the researcher will determine the subjects to be observed; select the setting for observation; and make arrangements for entry into the setting

for recording the data and printing the documents.

Step 4: Collection of data

This involves familiarisation with the setting and subjects; initial interaction; observation and recording.

Step 5: Analysis of Data

At this stage the researcher will undertake data reduction, presentation in tables and graphs, cross-tabulation and interpretation.

Step 6: Report writing

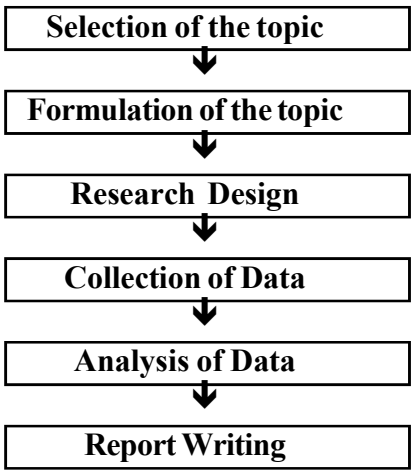
This involves the writing of the report to be published in same form.

b) The structure:

The structure and the process of observation depend on many factors, especially with regard to the underlying methodology. While in some cases observation is employed as participant observation, in other cases it might appear as non-participant observation. In case-study research, for instance, both direct-observation and participant observation can be employed; however in both cases its process is quite clearly explained and outlined in protocol.

In some cases observation is employed in a structured way, where everything must be followed to the last detail as prescribed in other cases it is done only while employing other methods, e.g. while interviewing respondents.

Steps in Observation



14.6 ADVANTAGES OF OBSERVATION

Bailey has pointed out four advantages of observation:

1. Superior in data collection on non-verbal behaviour:

When a persons opinion on a particular issue is to be assessed, survey method is definitely more useful, but when the non-verbal behaviour is to be discovered or where memory failure of the respondent is possible, observation will be more functional. It allows not the restrictive study of the individual but their in depth study. The unstructured observational method, being very flexible, allows the observer to concentrate on any variable that prove to be important.

2. Intimate and informal relationship:

Since the observer often lives with the subjects for an extended period of time, the relationship between them is often more intimate and more informal than in a survey in which the interviewer meets the respondents for 30-40 minutes on a very formal basis. The relationship sometimes becomes primary than secondary. Being close to the subject does not necessarily mean that observer will loose objectivity in recording facts. This becomes possible only when the observer becomes emotionally attached to his subjects.

3. Natural environment:

The behaviour being observed in natural environment will not cause any bias observation will neither be artificial nor restrictive.

4. Longitudinal Analysis:

In observation, the researcher is able to conduct his study over a much longer period than in the survey.

Earl Babbie, (1998:303) has stated the following strengths of field observation:

1. It is effective especially for studying social processes in depth over time.
2. It is a flexible technique in which research design can be modified at any time.
3. It is relatively in expensive.

Sarantakos (1998:219) has mentioned the following advantages of observation:-

1. It is less complicated and less time-consuming.
2. It offers data when respondents are unable or unwilling to co-operate for giving information.
3. It approaches reality in its natural structure and studies events as they evolve.
4. It allows collection of wide range of information.
5. It is relatively inexpensive.

14.7 LIMITATIONS AND WEAKNESSES OF OBSERVATION

According to Bailey (1982: 250-52), the disadvantages in observation technique are:-

1. **Lack of control:** In artificial setting, control over variable is possible but in natural environment, the researcher has little control over variable that affect the data.
2. **Difficulties of quantification:** The data collected through observation cannot be quantified. The recorded data will show how persons interacted with one

another but it cannot be completed the number of times they interacted. In communal riots, looting, arson, killing may be observed but it cannot be quantified what type of people indulged in what? It is difficult to categories in-depth emotional and humanistic data.

3. **Small sample size:** Observational studies use a smaller sample than survey studies. Two or more observers can study a bigger sample but then their observations cannot be compared. Since observations are made for a longer period, employing many observers can become a costly affair.

4. **Gaining entry :** Many times the observer has difficulty in receiving approval for the study. It is not always easy to observe the functioning of an organisation or institution without obtaining permission from the administrator. On such cases, he may not record observations then and there but may write notes at night.

5. **Lack of anonymity/studying sensitive issues :** In observational study, it is difficult to maintain the respondent's anonymity. In survey, it is easy for the husband to say that he has no quarrels and conflicts with his wife but in observation over a longer period of time, he cannot conceal them.

6. **Limited Study** : All aspects of the problem cannot be observed simultaneously. The observation technique studies only limited issues. Similarly, internal attitudes and opinions cannot be studied.

Williamson at al (1977) have discussed the following limitations of observation method:-

1. This method is not applicable to the investigation of large social settings.

2. There are few safeguards against biases of the researcher.

3. There is the related problem of selectivity in data collection.

4. The mere presence of the researcher in the setting may change the group/ social system to some extent.

Since there is no set procedure of observation technique, the researcher may not be able to explain how the work was done. If, therefore, becomes difficult to replicate the study.

It could thus be concluded that observation becomes an effective tool of scientific study when it is :

a) Planed systematically.

b) Recorded systematically

c) Is subjected to check and control, and

d) Selected observers have skills and are trained.

14.8 LET US SUM UP

Observation is therefore, one of the oldest methods and also a popular and effective method of data collection. It is employed in a number of forms ranging from participant to non-participant, from structured to unstructured and from direct to indirect observation. Data collection in this method is as organised and a systematic as in any other method.

CHECK YOUR PROGRESS

1. What is an observation method? Maintain various types of observation mainly focussing on participant and non-participant observation method.
2. What are the steps involved in the observation method?
3. What are the limitations and weaknesses of observation method?

14.9 SUGGESTED READINGS

1) C. R. Kothari (2001 Research Methodology, Methods and Techniques.
2) Black & Champion (1976) Methods & Issues in Social Research.
3. F.N. Kerlinger (1973) Foundations of Behavioural Research.
4. P.V. Young (1969) Scientific Social Survey ansd Research.

5. Cohen and Negel (1984) An Introduction to logic and Scientific Method.

14.10 ANSWERS TO CHECK YOUR PROGRESS

i) Observation is a method of data collection that employs vision as a main mean for collecting data.

ii) The various steps in observation are :-

1) Selection of Topic

2) Formulation of Topic

3) Research Design

4) Collection of Data

5) Analysis of Data

6) Report Writing

*****

INTERVIEW AND ITS TYPES

STRUCTURE

15.1 INTRODUCTION

The interview method is a kind of verbal technique for obtaining data.

Together with questionnaires, interviews make up the survey method, which is one of the most popular techniques of social research. It is the most commonly used method of data collection in the study of human behaviour. It is a direct method of data collection. According to P.V. young. "Interview may be regarded as a systematic method by which a person enters more or less imaginatively into the life of a comparative stranger. Interviews are employed as method of data collection in most research designs. Qualitative research/ studies employ unstandardised forms of interviewing, such as intensive interviewing and focused interviewing, while quantitative studies employ predominately structured interviews.

15.2 OBJECTIVES

The main objectives are :-

i) Meaning of Interview

ii) Types of Interview

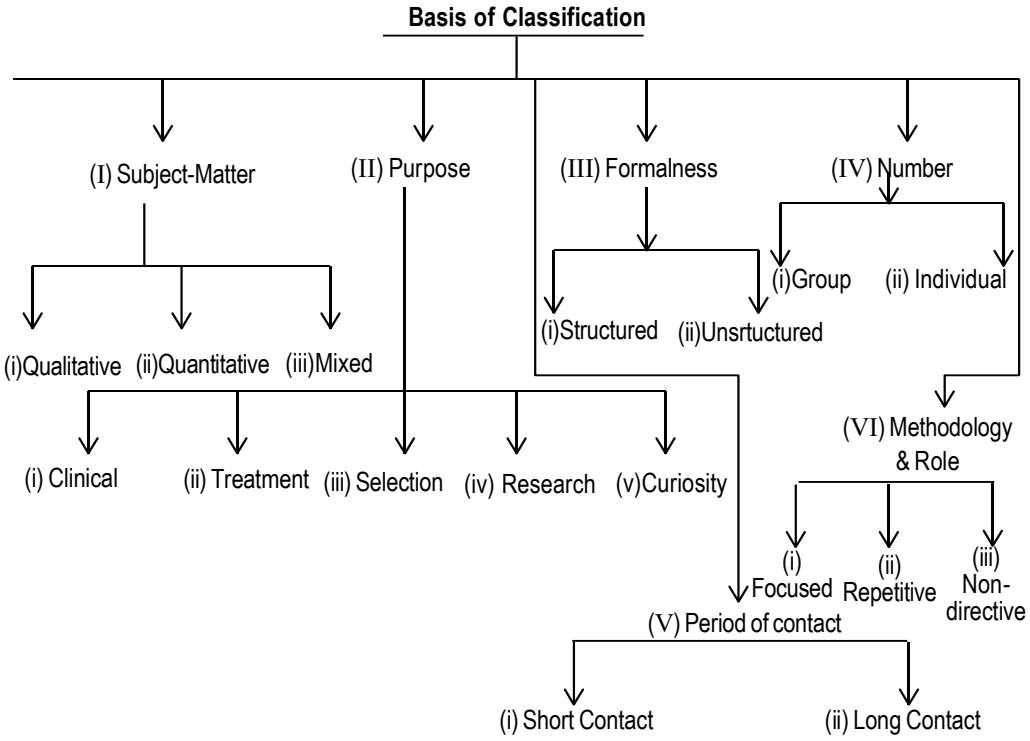
iii) Preparation for an Interview

iv) Merits and Demrits of Interview

15.3 TYPES OF INTERVIEWS

There are many types of interviews, each of which differs from the others in structure, purpose, role of interviewer number of respondents involved in each interview, and form and frequency of administration.

The types of interviews may be classified on the basis of the grounds, as given in the following chart.



15.3.1. On the Basis to subject Matter :

According to subject matter, the interview may be divided into three types, i.e.

(i) Qualitative interview

(ii) Quantitative interview

(iii) Mixed interview

(i) Quantitative Interview : In this type of interview, certain set facts are collected about a large number of persons, as in census.

(ii) Qualitative Interview : It consists of certain complex, serious and non-quantifiable subject-matter. This interview is confined to exploring the causes of some events. Sometimes it is called diagnostic interview.

(iii) **Mixed Interview :** It is a method where both types of data are required. Some of the data may be quantifiable & some not.

15.3.2 On the Basis of Purpose :

Every interview is done with certain aim or purpose in view. According to the purpose of the interview, it may be classified into the following types:

(i) **Clinical Interview :** Through the interview, the causes of certain abnormalities are ascertained.

(ii) **Treatment Interview :** This is a signal to the clinical interview caused after the abnormalities are ascertained.

Further interviews are held to know the actual cause of mental disorder of the particular patient.

(iii) **Selection Interview :** This interview is done to select an individual with some particular qualities.

(iv) **Interviews to fulfil curiosity :** Though these interviews, the interviewer fulfils his own curiosity, which irks in his mind.

(v) **Research Interview :** The interview is done to collect information about certain problems to find out the truth.

15.3.3 On the basis of Formalness :

According to formalness, the interview can be divided into two main types:

(i) **Structured Interviews :** These are based on a strict procedure and a highly structured interview guide, which is no different from a questionnaire. A structured interview is in reality a questionnaire read by the interviewer as prescribed by the researcher. This rigid structure determines the operation of this research instrument and allows no freedom to make adjustments to any of its elements, such as content, wording or order of the questions.

The interview is based on a schedule and strict adherence to the questions of the instructions is permanent. In this type of interviewing, the interviewer is

expected to perform like a 'robot' acting in a neutral manner, keeping the same tone of voice, offering the same impression to the respondents, using the same style, appearance, prompts, peabes etc. and showing no initiative spontaneity or personal interest in the research topic. The purpose of this is to reduce interviewer bias to a minimum and achieve the highest degree of uniformity in procedure. This form of interview is employed in quantitative research.

(iii) **Unstructured Interviews :** These have no strict procedures to follow of the kind described above. In their extreme form they are theoretically inconceivable, for every interview has a structure of some kind and is structured in some way and to some degree. Nevertheless, the strict control reported above is lacking here. There are no restrictions in the wording of the questions, the order of questions or the interview schedule. The interviewer acts freely in this context, on the basis of certain research points, formulating questions as and when required and employing neutral probing. The structure of these interviews is flexible and restrictions minimal, being presented in most cases in the form of guides rather than rules. This type of interview is mostly used in qualitative research.

Semi structured interviews lie somewhere between structured and unstructured interviews. They contain elements of both and while some are closer to structured interviews others are closer to unstructured interviews. The degree to which interviews are structured depends on the research topic and purpose, resources methodological standards & preferences and the type of information sought, which of course is determined by the research objective they can be both qualitative or quantitative techniques.

15.3.4. On the basis of Number :

This category has been classified under two main type i.e.,

(i) **Group Interview :** In this type of interview, a group of persons are interviewed for collecting information from them. This method economises both time and money.

(ii) **Individual Interview :** Here, a single individual is interviewed inter-

personal contact between the interviewer and interviewee can be established.

15.3.5 On the Basis of Period of Contact :

There are two types of interview on this basis i.e. Short contact inter view and long contact interview. Sometimes in social-research, filling up of schedules or questionnaires requires only a single sitting of small duration. For this type of job, a short-contact interview is the most useful method. But where the case history of an individual or a group of persons is required, prolonged-contact interview is necessary.

Besides the afore-mentioned classifications of interviews, P.V.Young has said emphasis on the classification of interviews according to the role assumed by the interviewer and respondent at the time of interview. These classifications, which are mainly based on methodology are given below:

(i) **Focused Interview :** This method has been applied by R.K.Merton for studying the psychological affects of Radio, Cinema, television etc. on the public. The main purpose of this type of interview is to examine a particular hypothesis. In such interviews, the direction of the interview lies in the hands of the interviewer. Such interviews are based on pre-determined situations. This type of interview gives importance to the emotional feelings or attitudes of the individuals in a particular situation.

(ii) **Repetitive Interview :** The main objective of this interview is to study the dynamic functions, attitudes, and behaviour of certain individuals. For studying human behaviour, this method is very useful. This type of interview require that the respondents must be permanent residents of a particular locality so that they may be available for interview at any time. In a sense, it is a costly affair, since a permanent organisation has to be set up for this.

(iii) **Non-Directed Interview :** There is no pre-planned set of questions control or any direction in this method. In this method an interviewer encourages the respondent to talk about the given topic without questioning him. For achieving the proper goal, the interviewer should create a suitable atmosphere in which

the individual is able to speak freely and fearlessly about himself. In problems like divorce and social disorganisation, this method is very useful.

15.4 PREPARATION FOR AN INTERVIEW

Before undertaking an interview, the interviewer must prepare the ground in a scientific manner. The stages of prior preparation for an interview are as follows:

(i) The investigator must understand the problem properly.

(ii) Before taking an interview, an interviewer must prepare the interview guide which gives an outline of the different aspects of the study. It may prove helpful in comparing data. It works as the memory tickler".

(iii) An interviewer should approach an interviewee at a time when the person is free and in a relaxed mood.

(iv) The interviewer must seek a prior appointment with the respondents. If this is done, the interviewer may plan his own schedule accordingly.

(v) Before undertaking an interview an interviewer must gather the names, addresses and particular social habits of the respondents.

(vi) When the general outline is prepared, the cases which are to be interviewed have to be selected by various sampling methods. The selected cases must be available at the time of interview.

(vii) Before starting the interview the interviewer must give his full introduction to the respondent.

(viii) For getting accurate information the head of the family on the leaders of the group should be interviewed.

15.5 PROCESS/TECHNIQUE OF INTERVIEW

It could be said that the training to the interviewer or the process of training implies explaining the interviewer the process of conducting the interview in a number of stages, each stage including certain tasks. These are explained as below :

(i) Fully explain the researcher what the study is all about, what are the objectives of

the study and what aspects of the theme are to be focused.

(ii) The interviewer must give the introduction about himself to the respondent.

(iii) The interviewer should create an atmosphere in which the interviewee can express himself freely.

(iv) The interviewer must prompt the memory of the interviewee.

(v) The questions should be put in a systematic way, in lucid language.

(vi) Emotional and leading questions should be avoided as for as possible.

(vii) If the time of interview, the interviewer must got down certain important points between brief pauses, between two questions.

(viii) When the respondent losses interest in the interview, the interviewer should try to recapture his interest.

(ix) The interview should not be closed abruptly.

(x) After the interview is over, the interviewer must write the report nicely and submit it as soon as possible.

15.6 MERITS & IMPORTANCE OF INTERVIEW

In social research qualitative phenomena are not amenable to statistical analysis. In such cases, the interview is a very useful tool to gain insight. The following are the main advantages of the interview method.

(i) An interview is a means of getting direct knowledge personally and therefore, the information is reliable.

(ii) It is possible to study these phenomena which are open to observation.

(iii) Through an interview it is possible to study abstract factors like attitudes, feelings, opinions reactions and so on.

(iv) It is possible to study the historical cases and past phenomena in an interview. The background of a case and the historical evidence can be best known from eye-witnesses and the observers.

(v) The background, milieu and the internal aspects of a phenomenon can be classified in an interview.

(vi) Through an interview, one can learn the past present and likely future behaviour of human beings. The recent motivations, hidden desires and incentives working on human minds may be revealed by this method.

(vii) In interview, the inflow and outflow of information and knowledge may be mutually helpful to the interviewer as well as to the interviewee and barriers in the flow of information are easily eliminated.

The information given by the interviewee may be selected through cross-examination and emotional excesses and sentimental out bursts can be easily identified.

(a) The method is highly flexible. New questions can be framed and cross-checking can be done under this method.

Direct interview eliminated personal barriers, brings each other very close, making the study more fruitful, thus giving an opportunity to study the immediate reaction of the interviewee. The interviewer acts as a catalysts and he must learn to successfully handle delicate situations.

15.7 DEMERITS & LIMITATIONS OF INTERVIEW:

1. Interview yields subjective information which may or may not be true.
2. It is a very expensive method, aseptically when large and widely spread geographical sample is taken.
3. There remains the possibility of the bias of interviewer as well as that of the respondent.
4. Certain types of respondents such as important officials or executives or people in high income groups may not be easily approachable under this method and to that extent the data may prove inadequate.
5. This method is relatively more-time consuming, specially when sample is large and recalls upon the respondents are necessary.
6. The presence of the interviewer on the spot may over-stimulate the respondent, sometimes even to the extent that he may give imaginary information just to make interview interesting.
7. Under the interview method the organisation required for selecting, training and supervising the field-staff is more complex with formidable problems.

8. Interviewing at times may also introduce systematic errors.

9. Effective interview presupposes proper rapport with respondents that would facilitate free and frank responses. This often a very difficult requirement.

15.8 LET US SUM UP

Interview method is a direct and most commonly used method of data collection. It is general a practical and effective method of data collection and one that can be adjusted to serve the needs of both the quantitative and qualitative researcher. Interviewers are used by social scientific in descriptive research as well as in applied research, in action research and participatory research. The versatility makes it a useful tool of social research..

CHECK YOUR PROGRESS

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

1. What is an Interview method ?

_____

_____

2 What is meant by structured interview

_____

_____

15.9 SUGGESTED READINGS

1. C.R. Kothari (2001) Research Methodology, Methods and Techniques.
2. Black & Champion (1976) Methods and issue in Social Research.
3. F. N. Kerlinger (1973) Foundations of Behavioural Research.
4. P.V Young (1969) Scientific Social Surveys and Research.
5. Cohen & Nagel (1984) An Introduction to Logic and Scientific Method.

15.10 ANSWERS TO CHECK YOUR PROGRESS

1. It is verbal technique for obtaining data.
2. It is a strict procedure in which proper guideline are required for conducting interview.

******

QUESTIONNAIRE AND SCHEDULE

QUESTIONNAIRE METHOD

STRUCTURE

Merits of the Schedule Method

Demerits of Schedule Method

Distinction between Schedule and Questionnaire

16.1 INTRODUCTION

The purpose of the research determines whether the survey procedure should be structured or unstructured. Generally, the structured approach is chosen when hypotheses are to be tested while unstructured approach is used when an exploratory study is to be conducted.

Questionnaire is the structured set of questions usually sent by mail, though sometimes it is delivered by hand also. A questionnaire method is that method in which a number of printed questions is used for collecting data. This list of questions is sent by mail to the respondents. After filling up the questionnaire they return it to the investigator. The questionnaire method has been defined by different sociologists in different ways.

According to Bogardus: "A questionnaire is a list of questions sent to a number of persons for them to answer. It secures standardised result that can be tabulated & treated statistically"

According to Goode & Halt: "In general the word questionnaire is a device for securing answers to questions by using a form C respondent fills in himself".

16.2 OBJECTIVES

The main objectives are :-

i) Meaning of Interview

ii) Types of Interview

iii) Preoparation for an Interview

iv) Merits and Demrits of Interview

16.3 PURPOSE OF QUESTIONNAIRE

(I) To collect information from the respondents who are scattered in a vast area.

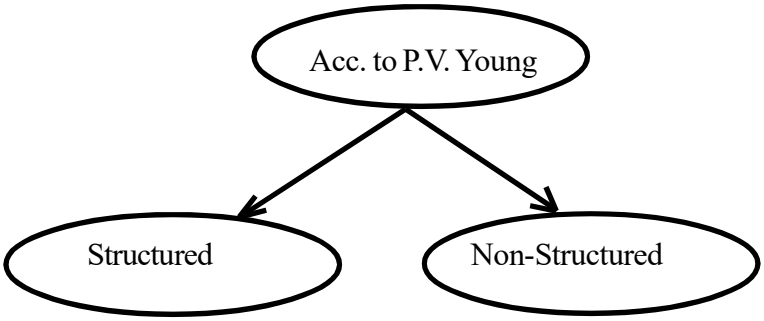
(ii) To achieve success in collecting reliable and dependable data.

16.4 TYPES OF QUESTIONNAIRE

P.V. Young has classified the questionnaire into two groups i.e.

(i) Structured Questionnaire

(ii) Non-structured Questionnaire

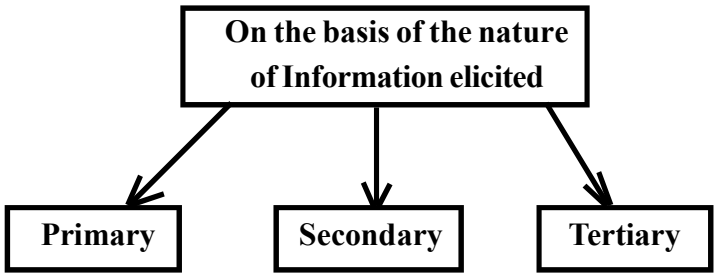


Structured Questionnaire: This contains definite, concrete and pre-ordained questions. This type of questionnaire is prepared in advance and not on the spot during the questioning period. The structured questionnaires are used in a wide range of projects. This method is used to initiate a formal inquiry and also to supplement and check data previously accumulated. These are mainly used in studies of economic and social problems, studies of administrative policies and changes, studies on the cost of living consumer expenditures, public health and many other issues.

Non-Structured Questionnaire: This is used as a guide at the time of interview. In this method, the interviewer is free to arrange the form and timing of enquiry. Flexibility is the main advantage of this method. This method is applied to studies of family group cohesiveness, to studies of personal experiences, beliefs, attitudes and the like.

Besides the above mentioned typology, questionnaires are further of different types.

1. On the basis of the nature of Information Elicited :



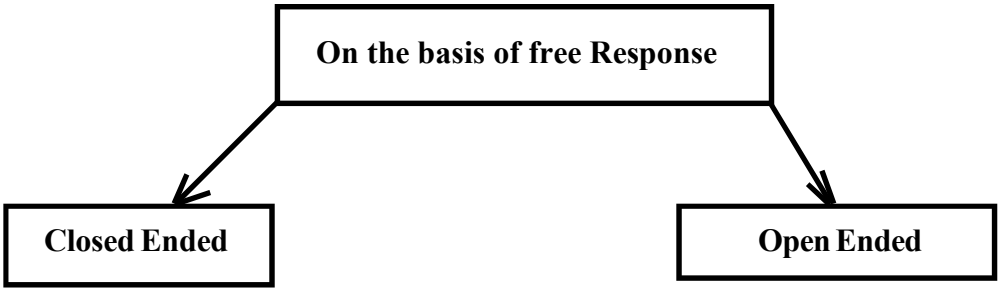
On the basis of the nature of information elicited, questions may be classified as primary, secondary and tertiary.

Primary Questions: Primary questions elicit information directly related to the research topic. Each question provides information about a specific aspect of the topic, that is, an indicator of a particular variable. In a study of marital power, the question who is the boss in your marriage is a primary question.

Secondary Questions: Secondary questions are questions which do not relate directly to the research topic. They are of secondary importance in that they provide information on secondary issues such as consistency of opinion on reliability of the instrument used. They do not add new information about the research topic they guard methodological soundness, integrity of the questionnaire or truthfulness of the respondents.

Tertiary Questions : Tertiary questions have neither primary nor methodological significance. They help to establish a frame work that allows convenient data collection and sufficient information without exhausting on blasing the respondent.

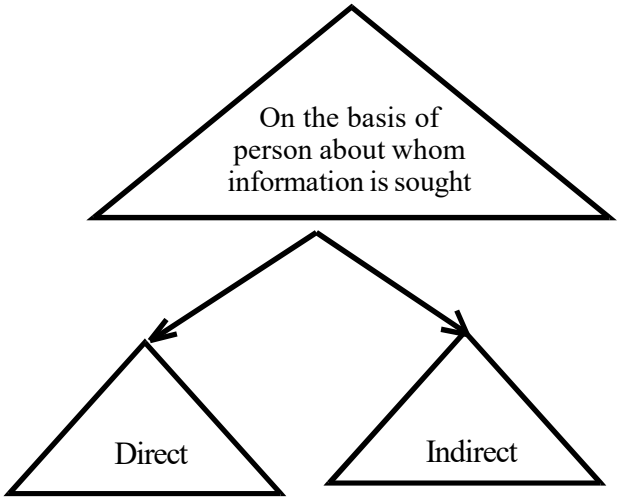
On the basis of free Response :



Closed -Ended Question : Closed ended questions are fixed-choice questions. They require the respondent to choose a response from those provided by the researcher. The respondent has no liberty to express his own judgement.

Open-ended questions : The open ended questions are free-response questions which require respondents to answer in their own words. Since open-ended questions entail more work both for the researcher and the respondents, these are used sparingly in the questionnaires.

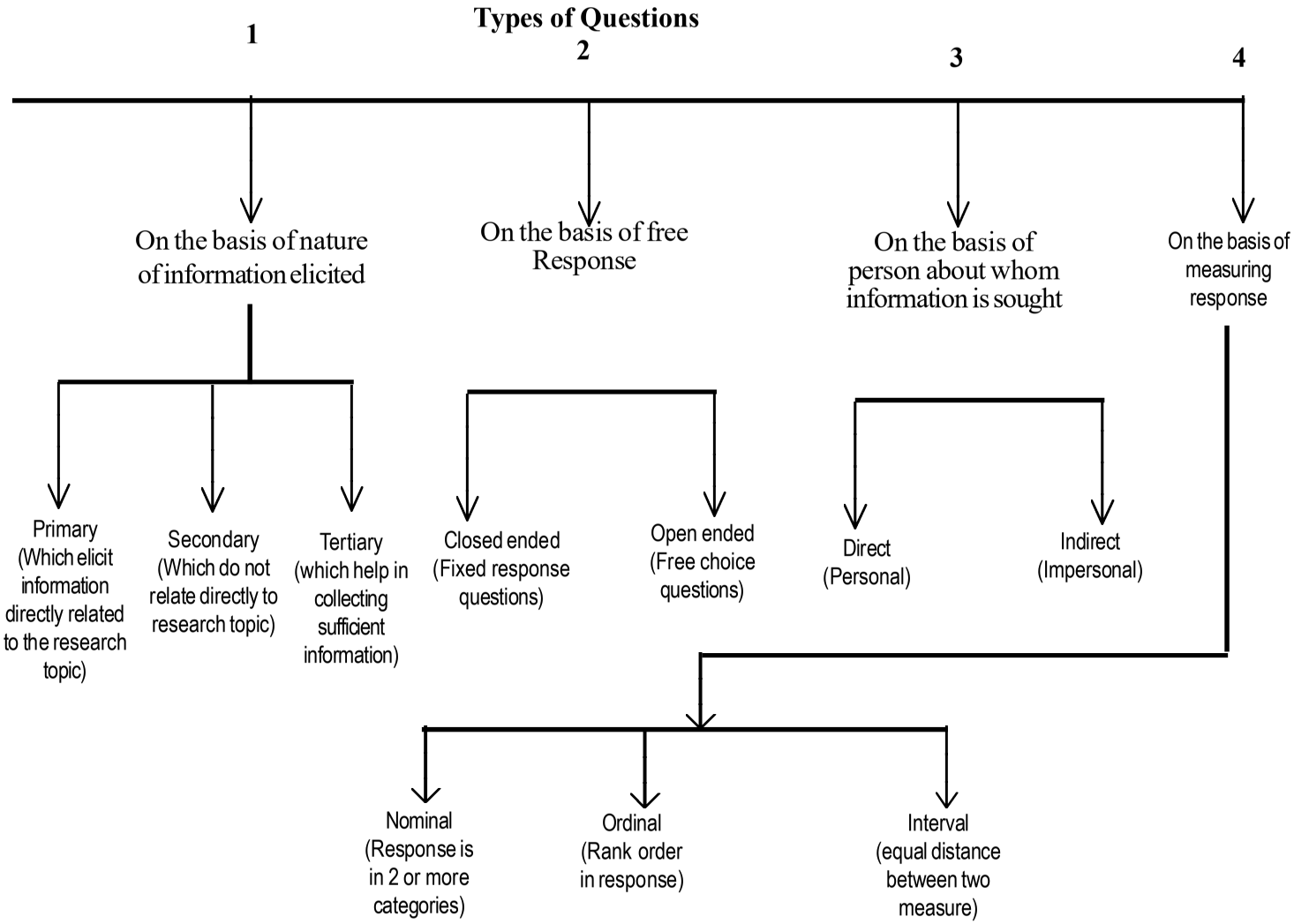
3. On the basis of persons about whom information is sought :



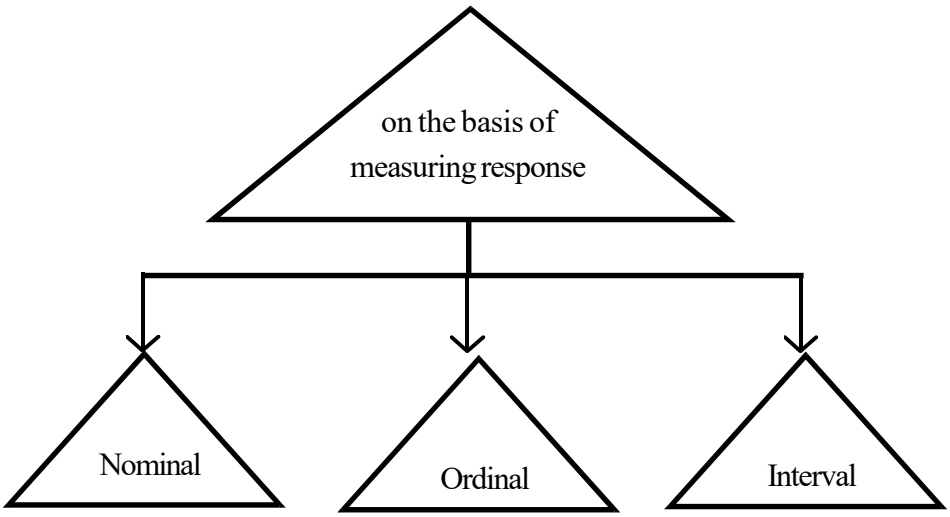
Direct Questions : Direct or personal questions ask the respondent to offer information about himself or herself. An example of a direct question is: ”Do you believe in God?”

Indirect Questions : Indirect questions are the respondent to offer information about her people, assuming that in this way the respondent will indirectly tell about himself or herself. An example of an indirect question is “ ‘Do you think that people of your status and age believe in God now a days?

In direct questioning is mainly used when the respondent is unable or unwilling to offer direct information on research question and hence then indirect questioning makes it easy for the respondent to answer the questions.


Types of Questions
1
2
3
4
On the basis of nature of information elicited
On the basis of free Response
On the basis of person about whom information is sought
On the basis of measuring response
Primary (Which elicit information directly related to the research topic)
Secondary (Which do not relate directly to research topic)
Tertiary (which help in collecting sufficient information)
Closed ended (Fixed response questions)
Open ended (Free choice questions)
Direct (Personal)
Indirect (Impersonal)
Nominal (Response is in 2 or more categories)
Ordinal (Rank order in response)
Interval (equal distance between two measure)

On the basis of measuring response :



Nominal question is one in which its response falls in two or more categories e.g. male/ female; married / unmarried; rural/urban; illiterate/educated; Shia / Suni; Hind/Muslim. However, the categories have no rank order. Nominal question is also called classification scale. Ordinal question is one in which the responses are placed in rank order of categories. The categories may be ranked from highest to lowest, greatest to least or first to last. There is no implication that there is an equal distance between succeeding categories. Ordinal scales are sometimes refered to as ranking scales. Interval question is one in which the distance between two numbers is equal.

Examples of ordinal Scale :

1. Smoking : Regularly/occasionally/never

2. Receiving 33 percent seats for women in Parliament : Agree/disagree/don't know.

Examples of Interval Scale :

1. Present age : 10 or below/11-20/21-30/31-40/41 and above 2. Age at Marriage : Below 18/18-22/22-26/26/26-30/ Above 30.

Other types of Questions :

(a) Suggestive Questions : Suggestive questions presuppose that the respondent

holds a particular view on the issue in question that is similar to that of the researcher and contain an implied attempt to tempt the respondent to confirm this view. e.g. if we were to test the views of students to examinations, a direct question could have been: 'Do you believe that examinations should be abolished in all sociology subjects'? In a suggestive mode this question could read as follows " Don't you also think that examinations should be abolished suggestive question lead the respondent and bias the direction of findings.

(b) **Filter and Contingency Questions :** Filter questions aim at eliciting, for the first time in the study information related to a general aspect of the research topic, and are usually followed by another more specific question. An example of such a question is: 'Do you smoke'?

Contingency questions are geared towards eliciting additional and more specific information on an issue already addressed by a filter question. After an issue has been addressed through a filter question (e.g. Do you smoke?)' the contingency question may read as follows: "How many cigarettes do you smoke each day? "Asking contingency questions before filter questions are introduced is not a correct practice.

16.5 FORM OF A QUESTIONNAIRE

Proper size and form of a questionnaire plays a vital role in social research. Hence, before preparing a questionnaire, certain points are to be considered. These are following :

1. **Size of questionnaire :** The size of the questionnaire must be small and manageable.

2. **Appearance :** Good quality paper, attractive printing and layout have great importance in the questionnaire method.

3. **Clarity :** To obtain correct answers, the questions should be clear & precise. There should not be any ambiguity about the idea of the questions.

4. **Sequence :** The questions should be in proper sequence, lucid and interesting to

the respondent.

5. **Margin :** A proper margin on one side gives a neat look to the questionnaire and it makes filling easy.

6. **Spacing :** The lines should not be very closely printed sufficient space should be left out to demarcate one question from the other.

7. **Length of Questions :** The questions must not be too lengthy.

8. **Technical Terms :** Technical terms as well as abbreviations should not be used in a questionnaire.

9. **Attractiveness:** The questionnaire should be formed in such a way as to attract the respondents quickly

16.6 CHARACTERISTICS OF A GOOD QUESTIONNAIRE

The preparation of a good questionnaire is a highly skilled art. The requisites of a good questionnaire are given below :

1. Analytical questions.
2. A lucid heading to the questionnaire, indicating the object and nature of enquiry.
3. Clear and short questions.
4. Necessary instructions regarding filling up the form must be given.
5. Limited number of questions.
6. Clarity
7. Questions should be capable of being answered without prejudice.
8. The questions must be well arranged.
9. The questionnaire should be reasonable in size.
10. Emotional questions should be avoided.

11. Answers to the questions should be corporative in nature.

12. Answer to the questions should be objective and capable of tabulation.

13. Good presentation of schedule of questions.

16.7 STEPS IN QUESTIONNAIRE CONSTRUCTION

Questionnaires are constructed in a very sophisticated and systematic manner. The process of construction goes through a number of interrelated steps and offer a basic for the research stage to follow some steps seem to receive more attention than others, and the following are the most commonly mentioned steps of questionnaire construction.

Step 1: Preparation:

The researcher decides what is the most suitable type of questionnaire and determines the way it will be administered. As well a search for relevant questionnaires that might have already been developed by other investigators is undertaken. If suitable questionnaire are found they guides in the construction of the new questionnaire of the search in unsuccessful a new questionnaire is developed.

Step 2: Constructing the first draft:

The investigator formulates a number of questions, usually a few more than required, including questions of substance (directly related to aspects of the research topic) questions of method (those testing reliability and wording), and secondary as well as tertiary questions.

Step 3: Self Critique :

These questions are tested for , among other things relevance symmetry, clarity and simplicity, as well as for whether they comply with the basic rules of questionnaire construction presented above.

Step 4: External Scrutiny :

The first draft is then given to experts for scrutiny & suggestion. It is anticipated that some questions might be changed or eliminated while new questions might be suggested.

Step 5 : Re-examination and revision :

The critique offered by the experts & group leaders will be considered and eventual changes implemented. If the revision is not significant, the investigator proceeds to the next step. If the revision is substantial, the questionnaire is presented again to experts and later re-examined and revised until it is considered satisfactory. The investigator then proceeds to the new step.

Step 6: Pre-test or pilot study :

The most cases a pilot study or a pre-test is undertaken to check the suitability of the questionnaire as a whole (pilot study) or of some aspects of it (pre-test). A small sample is selected for this purpose and pre respondents requested to respond to the whole or part of the questionnaires the result are then analysed and interpreted.

Step 7: Revision:

The pre-test and pilot study usually result in same minor or major changes. If the changes are minor, the investigators will proceed to step 8. But if the changes are major they will return to step 4.

Step 8: Second Pre Test :

The revised questionnaire is then subjected to a second test, mainly with regard to the revised questions. The response is considered and adjustments and revision follow.

Step 9: Formulation of the final draft:

In this step, a part from implementing the suggestions derived from the pre-tests, the investigator concentrates on editorial works, checking for spelling, mistakes,

legibility, instructions, layout, space for responses, pre-coding, scaling issues & general presentation of questionnaire. This copy will finally be sent to the printer.

16.8 ADVANTAGES OF QUESTIONNAIRE

1. Lower Cost :

Questionnaires are less expensive than other methods. Even the staff required is not much as either the researcher himself may mail or one/two investigators may be appointed for hand-distributing the questionnaires. In questionnaire the researcher has only to spend money on postage for sending the questionnaires and stamped envelopes for getting back the filled in questionnaires. The mailed questionnaires thus cost less.

2. Time Saving

Since the respondents may be geographically dispersed and sample size may be very large, the time required for getting back the questionnaires may be little greater but usually less than that for face-to-face interviews. Thus, since all questionnaires are sent simultaneously and most of the replies are received in 10-15 days, schedules take months to complete. In simple terms, questionnaire produce quick results.

3. Accessibility to widespread respondents :

When the respondents are separated geographically, they can be reached by correspondence which saves travel cost.

4. No interviewer's Bias :

Since the interviewer is not physically present at interviewer's place, he cannot influence his answers, either by prompting or by giving his own opinion or by misleading the question.

5. Generate Anonymity :

The absence of the interviewer assures anonymity which enable respondent to express free opinions and answers even to socially undesirable questions. The absence of the interviewer assures privacy to the respondents because of which they willingly give details of all events and incidents they would have not revealed

otherwise.

6. Respondent's Convenience :

The respondent can fill-in the questionnaire leisurely at his convenience. He is not forced to complete all questions at one time. Since he fill up the questionnaire in spare time, he can answer easy questions first take time for difficult questions.

7. Standardised wordings :

Each respondent is exposed to same words and therefore there is little difference in understanding questions. The comparison of answers is thus facilitated.

8. No variation :

Questionnaires are a stable, consistent and uniform measure, without variation.

16.9. LIMITATIONS OF QUESTIONNAIRE

1. The mailed questionnaires can be used only for educated people. This restricts the number of respondents.
2. The return rate of questionnaires in low. The common return rate is 30 to 40 percent.
3. Sometimes different respondents interpret questions differently. The misunderstanding cannot be corrected.
4. There may be bias in the response selectively because the respondent having no interest in the topic may not give response to all questions. Since the researcher is not present to explain the meaning of certain concepts the respondent may leave the question blank.
5. Questionnaires do not provide an opportunity to collect additional information while they are being completed.
6. Many questions remain unanswered. The partial response affects the analysis.
7. The respondents can consult other persons before filling in the questionnaire. The responses, therefore cannot be viewed as his opinions.

8. Since the size of the questionnaire has to be kept small, full information cannot be secured from the respondents.

9. There is lack of depth or probing for a more specific answer.

16.10 SCHEDULE METHOD

Meaning : A schedule is a list of questions, which helps to collect data or requisite information. In this method, the investigator himself presents the questionnaire to the individuals whose responses are needed. According to Goode & Hall, "Schedule is the name usually applied to a set of questions which are asked and filled by an interviewer, in a face-to-face situation with another.

Both questionnaires and schedules are very similar, but they also differ in some respects. A questionnaire is sent to the respondent by mail, where as a schedule is used directly in interviews.

16.11 FEATURES OF A SCHEDULE

1. The list of questions is a mere document, so it need not be very attractive.

2. The schedule can be used in a limited area of research.

3. The schedule is put directly by the researcher and the answers are also noted down by him.

16.12 OBJECTIVES OF THE SCHEDULE

P.V. Young has laid great importance on the following aims of the schedule.

1 **Determination of the topic :** In the schedule method, the data should be collected in an objective manner.

(i) **Aid Memory :** This methods acts as a 'memory tickler'. A set of questions is prepared in a planned manner and the researcher is always armed with the formal document containing the questions. So if he forgets to ask some important questions, he may then take the help of the formally prepared document.

(ii) **Aid to Classification & Analysis :**

Through this method the data are classified and analysed in a scientific manner.

16.13 TYPES OF SCHEDULES

According to P.V. young, the schedule can be divided into the following four parts.

(i) Observation Schedules :

These schedules contain some specific aspects on which the observer has to concentrate and collect information with the help of these schedules, the observation becomes more accurate. This schedule serves many purposes i.e. it is a standardising device, it is a specific memory tickler, and it makes observation more accurate.

(ii) Document Schedules:

These schedules are used for recording data from case histories, documents, official records and so on. It is a very useful method for collecting preliminary data tabulations are made from these schedules either manually or mechanically.

(iii) Evaluation schedules :

These schedules are used to gather information about some institutions or agencies. They help us to study their immediate problems.

(iv) Rating Schedules :

These are mainly used in sociological or psychological research. They are especially applicable in case where opinion, attitude and behaviour are to be measured. Through these schedules, different ranks or measures are prepared and rating is done on the basis of these.

(v) Interview Schedules:

These schedules are used during interviews certain standard and specific questions are asked by the interviewer and he has to fill up all the information obtained in the table.

16.14 CONSTRUCTION OF A SCHEDULE

For constructing a good schedule, the following steps should be considered:

1. The investigator should have proper knowledge about the problem and he should know what information is required for a valid and accurate generalisation on each problem.
2. Questions must be complete, lucid and precise. They should be so framed that the respondents can easily group their meaning.
3. The physical design of the schedule plays a vital role in getting the information quickly. The schedule should be well planned and good looking.
4. It should be short with proper margins.
5. Questions should be placed in a well-ordered serial.
6. Good quality paper should be used.
7. The print should be easy to read and well spaced.
8. If necessary, pictures may be used along with the questions to make the schedule attractive.

Merits of the schedule method:

1) The answers are not biased as the field workers are personally present to remove any doubt.
2) The percentage of response is much higher in this method.
3) It saves times as the researcher is allowed to use abbreviations.
4) Deeper probing is possible because of direct contact.

Demerits of the Schedule Method :

1) It is an expensive affair and covers only a small area.

2) It requires a large no. of well trained field workers which in turn involves a great field workers which in turn involves a great cost

3) For conducting a survey through schedule method, elaborate administrative & organisational arrangements are necessary.

4) In some cases, the presence of the field worker creates a source of bias in the interview, since the opinion of the respondent may be influenced by the field worker.

Distinction between Schedule and Questionnaire :

1) Methodology : The schedule is a direct method. Here the researcher comes in direct contact with the respondent, whereas in questionnaire method the data are collected indirectly through communications.

2) Types of Questions : In schedule method, the questions that are included are short. But the questionnaire method consists of rather lengthy questions, to get detailed information.

3) Reliability : The information that is collected through the schedule method is more reliable. But in questionnaire method, reliability is somewhat doubtful.

4) Area : The schedule method course only a limited area, whereas the questionnaire method covers a wide area.

Classification of Questions :

In schedule method, an investigator can collect the information from uneducated people by clarifying the meaning and purpose of the question and study. But this is not possible in the questionnaire method.

4. Collection of Information :

Through the schedule method, it is not possible to collect confidential information, whereas in questionnaire method, the respondent is free to express the actual fact.

5. Use in sampling method :

Questionnaire method is not useful for sampling unlike the schedule, which is very useful for sampling.

6. Representativeness:

The data collected through the questionnaire are not completely representative, since the investigator is not present before the respondent who has to give the information. The respondent may be unable to understand the meaning of the questions and hence may not be able to answer correctly. This problem does not arise in the schedule method.

7. Structure of Questions:

In the questionnaire method, the questions are made on the basis of the cultural and education background of the respondents. In a word, it is respondent-oriented. But the schedule method is just opposite to this.

CHECK YOUR PROGRESS

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

1. What is a questionnaire method ?

_____

_____

2. Describe briefly the various types of questionnaires.

_____

_____

16.15 LET US SUM UP

It is summarized that questionaire is a structured set of questions sent by mail and cometimes by hands also. Schedule one of the methods of data collection also discussed in this chapter which refers to the investigator himself presents the questionaire to the respondents whose responses are to be needed.

16.16 SUGGESTED READINGS

1 C.R. Kothari (2001) Research Methodology, Methods & Techniques.

2 Black and Champion (1976) Methods & Issues in Social Research.

3 F.N. Kerlinger (1973) Foundations of Behavioural Research.

4. P.R. Young (1969) Scientific Social Surveys and Research.

5. Cohen and Nagel (1984) An Introduction to logic and Scientific Method.

16.17 ANSWERS TO CHECK YOUR PROGRESS

1. Questionaire is a structured Act of questions sent by mail and sometimes by hands also.

2. Types of Questionaire

   i) Structured

   ii) Non Structured

   iii) Open - ended

   iv) Close - ended

   v) Direct

   vi) Indirect

*****

MEANING OF CENTRAL TENDENCY : MEAN, MEDIAN, MODE

Structure

17.1 INTRODUCTION

One of the most important objectives of statistical analysis is to get one single value that describes the characteristic of the entire mass of unwieldy data. Such a value is called the central value or an average of the expected value of the variable. The word average is very commonly used in day-to-day conversation.

According to Clark, Average is an attempt to find one single to describe whole of figures.

According to Leabo, The average is sometimes described as a number which is typical of the whole group.

Therefore it is clear that an average is a single value that represents a group of values. Such a value is of great significance because it depicts the characteristic of the whole group. Since an average represents the entire data, its value lies somewhere in between the two extremes, i.e., the largest and the smallest items. For this reason an average is frequently referred to as a measure of central tendency.

17.2 OBJECTIVES

In this lesson you will be able to know :-

* To understand the meaning of central tendency.
* To study the various types of measuring central tendencies.
* To look into the objectives and requisites of average.
* To study the mean, median and mode in order to understand the central tendency.

17.3 BASIC OBJECTIVES OF AVERAGING

There are two main objectives of the study of averages:

i) To get single value that describes the characteristic of the entire group. Measures of central tendency, by condensing the mass of data in one single value, enables us to get a bird's eye view of the entire data. Thus one value can represent thousands, lakhs and even millions of values.

ii) To facilitate comparison. Measures of central value, by reducing the mass of data to one single figure, enable comparison to be made. Comparison can be made either at a point of time or over a period of time. However while making comparisons one should also take into account the multiplicity of forces that might be affecting the data.

17.4 REQUISITES OF GOOD AVERAGE

Since an average is a single value representing a group of values, it is desired that such a value satisfies the following properties:

i) Easy to understand. Since statistical methods are designed to simplify complexity, it is desirable that an average be such that can be readily understood; otherwise, its use is bound to be very limited.

ii) Simple to compute. An average should not only be easy to understand but also simple to compute so that it can be used widely. However, though ease of computation is desirable, it should be sought at the expense of other advantages i.e., if in the interest of greater accuracy, use of more different average is desirable, one should prefer that.

iii) Based on all the items. The average should depend upon each and every item of the series so that if any of the items is dropped the average itself is altered.

iv) Not be unduly affected by extreme observations. Although each and every item should influence the value of the average, none of the items should influence it unduly. If one or two very small or very large items unduly affect the average i.e., either increase its value or reduce its value, the average cannot be really typical of the entire series. In other words, extremes may distort the average and reduce its usefulness.

v) Rigidly defined. An average should be properly defined so that it has one and only one interpretation. It should preferably be defined by algebraic formula so that if different people compute the average from the same figures they all get the same answer. The average should not depend upon the personal prejudice and basis of the investigator; otherwise the results can be misleading.

vi) Capable of further Algebric Treatment. We should prefer to have an average that could be used for further statistical computations so that its utility is enhanced. For example, if we are given the data about the average income and number of employees of two or more factories, we should be able to compute the combined average.

vii) Sampling stability. Last, but not the least, we should prefer to get a value which has what the statisticians call sampling stability. This means that if we pick 10 different groups of college students, and compute the average of each group, we should expect to get approximately the same value. It does not mean, however that there can be no difference in the values of different samples. There may be some difference but those samples in which this difference is less are considered better than those in which this difference is more.

17.5 TYPES OF AVERAGE

The following are the important types of averages:

* Arithmetic Mean
* Median
* Mode
* Geometric Mean
* Harmonic Mean.

17.6 ARITHMETIC MEAN

The most popular and widely used measure of representing the entire data by one value is what most laymen call an average and what the statisticians call the arithmetic mean. Its value is obtained by adding together all the items and by dividing this total by the number of items.

Arithmetic Mean may either be

i) Simple Arithmetic Mean, or

ii) Weighted Arithmetic Mean.

Calculation of Simple Arithmetic Mean--- Individual Observations

The process of computing mean in case of individual observations is very simple. Add together the various values of the variable and divide the total by the number of items.

Symbolically: $\overline{X} = \frac{X1+ X2+ X3 +\ldots\ldots Xn}{N}$

Or $\bar{X} = \frac{\sum X}{N}$

Here , $\bar{X}$ is the Arithmetic mean, N is the number of observations and $\sum X$ is the sum of the observations.

Steps

The formula involves two steps in calculating mean:

i) Add together all the values of the variable X and obtain the total i.e. X.

ii) Divide this total by the number of the observations i.e., N.

Illustration I

The following table gives the monthly income of 10 employees in an office. Calculate the arithmetic mean of incomes.

Income(Rs.) 1780 1760 1690 1750 1840 1920 1100 1810 1050 1950

Solution:

	X
i)	1780
ii)	1760
iii)	1690
iv)	1750
v)	1840
vi)	1920

vii) 1100

viii) 1810

ix) 1050

x) 1950

$$\bar{X} = \frac{\Sigma X}{N} \qquad \Sigma X = 16{,}650,\ N = 10$$

$$\bar{X} = \frac{16{,}650}{10} = 1665.$$

Hence the average income is Rs. 1665.

Short- cut Method

The arithmetic mean can be calculated by using what is known as an arbitrary origin. When deviations are taken from an arbitrary origin, the formula for calculating arithmetic mean is

$$\bar{X} = A + \frac{\Sigma d}{N}$$

where A is the assumed mean and d is the deviation of items from the Assumed mean, i.e. d= (X-A).

Steps

Take an assumed mean.

i) Take the deviations of items from the assumed mean and denote these deviations by d.

ii) Obtain the sum of these deviations, i.e., ?d.

iii) Apply the formula.

From illustration I calculate arithmetic mean by taking 1,800 as the assumed mean.

Solution

Calculation of arithmetic mean

Income(Rs.)	(X-1800)	
1780	-20	
1760	-40	1670-320
1690	-110	+1620
1750	-50	
1840	+40	
1920	+120	
1100	-700	
1810	+10	-1620+ - 370
1050	-750	
1950	+150	
N=10	Σd= -1350	

$$\bar{X} = A + \frac{\Sigma d}{N}$$

A= 1800

$$\bar{X} = 1800 + \frac{(-1350)}{10}$$

$$\bar{X} = 1665.$$

Hence the average income is 1665.

Calculation of Arithmetic Mean----- Discrete series

In discrete series arithmetic mean may be computed by applying

i) Direct method, or

ii) Short-cut method.

Direct Method

The formula for computing mean is

$$\bar{X} = \frac{\sum fX}{N}$$

Where, f = frequency, X = the variable in the question; N= total number of observation i.e. ∑f.

Steps

i) Multiply the frequency of each row with the variable and obtain the total ΣfX.

ii) Divide the total obtained by step i by the number of observations, i.e., total frequency.

Illustration

From the following data of the marks obtained by 60 students of a class, calculate the arithmetic mean:

Marks	No. of students
20	8
30	12
40	20
50	10
60	6
70	4

Solution :

Marks(X)	No. of students (f)	fX
20	8	160
30	12	360
40	20	800
50	10	500
60	6	360
70	4	280
	N= 60	ΣfX= 2460

$$\bar{X} = \frac{\Sigma fX}{N}$$

$$= \frac{2460}{60} = 41.$$

$$\bar{X} = 41.$$

Hence the average marks=41.

Short- Cut Method

According to this method,

$$\bar{X} = A + \frac{\sum fd}{N}$$

where A is the assumed mean and d is the deviation of items from the Assumed mean, i.e. d= (X-A).

Steps

i) Take an assumed mean.

ii) Take the deviations of the variable X from the assumed mean and denote the deviations by d.

iii) Multiply these deviations with the respective frequency and take the total ?fd.

iv) Divide the total obtained in third step by the total frequency.

Calculate the arithmetic mean from the above illustration using short- cut method.

Solution :

Marks(X)	**No. of students (f)**	**d= (X-A) A=40**	**fd**
20	**8**	**-20**	**-160**
30	**12**	**-10**	**-120**
40	**20**	**0**	**0**
50	**10**	**+10**	**+100**
60	**6**	**+20**	**+120**
70	**4**	**+30**	**+120**
	N= 60		**Σfd= 60**

$$\bar{X} = A + \frac{\Sigma fd}{N}$$

$$= 40 + \frac{60}{60}$$

$$= 40+1$$

$$=41.$$

$$\bar{X} = 41.$$

Calculation of Arithmetic Mean----Continuous series

In continuous series, arithmetic mean may be computed by applying any of the following methods:

i) Direct Method

ii) Short-cut method

Direct Method

when direct method is used

$$X = \frac{?fm}{N}$$

Where m= midpoint of various classes; f= the frequency of each class; N= the total frequency.

Steps

i) Obtain the mid-point of each class and denote it by m.

ii) Multiply these mid-points by the respective frequency of each class and obtain the total ?fm.

iii) Divide the total obtained in step I by the sum of the frequency.

Illustration

From the following data compute arithmetic mean.

Marks	**No. of students**
0-10	**5**
10-20	**10**
20-30	**25**
30-40	**30**
40-50	**20**
50-60	**10**

Solution :

Marks(X)	No. of students (f)	Mid-point (m)	fm
0-10	5	5	25
10-20	10	15	150
20-30	25	25	625
30-40	30	35	1050
40-50	20	45	900
50-60	10	55	550
	N=100		Σfm= 3300

$$\bar{X} = \frac{\Sigma fm}{N}$$

$$= \frac{3300}{100}$$

$$\bar{X} = 33.$$

Short cut Method

When short cut method is used, arithmetic mean is computed by applying the following formula:

X = A+ ?fd

N

Where A= Assumed Mean; d=deviations of midpoints from assumed mean i.e. (X-A); f=the frequency of each class; N= the total frequency.

Steps

i) Take an assumed mean.

ii) From the mid-point of each class deduct the assumed mean.

iii) Multiply the respective frequencies of each class by these deviations and obtain the total ?fd.

iv) Apply the formula.

Illustration

Calculate arithmetic mean by the short-cut method from the data of above illustration.

Solution :

Marks(X)	No. of students (f)	Mid-point (m)	d= (m-A) A=35	fd
0-10	5	5	-30	-150
10-20	10	15	-20	-200
20-30	25	25	-10	-250
30-40	30	35	0	0
40-50	20	45	+10	+200
50-60	10	55	+20	+200
	N=100			Σfd= -200

$$\bar{X} = A + \frac{\Sigma fd}{N}$$

$$= 35 + \frac{(-200)}{100}$$

$$\bar{X} = 33.$$

In order to simplify the calculations, we can divide the deviations by the class intervals i.e., calculate (m-A)/I and then multiply by I in the formula for getting mean. The formula becomes:

$$\bar{X} = A + \frac{\Sigma fd}{N} \times i$$

Solution :

Marks(X)	No. of students (f)	Mid-point (m)	d= (m-A)/i A=35	fd
0-10	5	5	-3	-15
10-20	10	15	-2	-20
20-30	25	25	-1	-25
30-40	30	35	0	0
40-50	20	45	+1	+20
50-60	10	55	+2	+20
	N=100			Σfd= -20

$$\bar{X} = A + \frac{\Sigma fd}{N} \times i$$

$$= 35 + \frac{(-20)}{100} \times 10$$

$$\bar{X} = 33.$$

It is clear from above that all the three methods of finding arithmetic mean in continuous series gives us the same answer. The direct method, though the simplest, involves more calculations when midpoints and frequencies are very large in magnitude.

17.7 ITS MERITS AND LIMITATIONS

Merits

Arithmetic mean is most widely used in practice because of the following reasons:

* It is the simplest average to understand and easiest to compute. Neither the arraying of data as required for calculating median nor grouping of data as required for calculating mode is needed while calculating mean.
* It is affected by the value of every item in the series.
* It is defined by a rigid mathematical formula with the result that everyone who computes

the average gets the same answer.

* Being determined by a rigid formula, it lends itself to subsequent algebraic treatment better than the median or mode.
* It is relatively reliable in the sense that it doesnot vary too much when repeated samples are taken from one and same population atleast not as much as some other kind of statistical descriptions.
* It is a calculated value, and not based on position in the series.

Limitations

* In a distribution with open-end classes the value of mean cannot be computed without making assumptions regarding the size of the class interval of the open-ended classes. If such classes contain a large proportion of values, then mean may be subject to substantial error. However, the values of the median and mode can be computed where there are open-ended classes without making any assumptions about size of class interval.
* The arithmetic mean is not always a good measure of central tendency. The mean provides a characteristic value, in the sense of indicating where most of the values lie, only when the distribution of the variable is reasonably normal.

17.8 MEDIAN

The median by definition refers to the middle value in a distribution. In case of median one- half of the items in the distribution have a value the size of the median value or smaller and one-half have a value the size of median value or larger. The median is just the 50th percentile value below which 50 per cent of the values in the sample fall. It splits the observation into two halves.

As distinct from the arithmetic mean which is calculated from the value of every items in the series, the median is what is called a positional average .The terms "Position" refers to the palace of a value in series . The place of median in a series is such that an equal number of items lie on either side of it

For example ,if the income of five employees is Rs.900,950,1020,1200 and 1280 the median would be 1020.

900

950

1020 value at middle position of the array

1200

1280

For the above example the calculation of median was simple because of odd number of observations. When an even number of observations are listed, there is no single middle position value and the median is taken to be the arithmetic mean of two middlemost items. For example if In the above case we are given the income of six employees as 900, 950, 1020, 1200, 1280, 1300, the middle income would be:-

900

950

1020

1200

1280

1300

Median=Size of(N+1)/2 th item, i.e3.5th item

Median = $\frac{1020+1200}{2} = \frac{2220}{2} = 1110$

Hence, In case of even number of observations median may be found by averaging two middle position values.

Thus, When N is odd , the median is an actual value, with the remainder of the series in two equal parts on either side of it. If N is even, the median is a derived figure, i.e. half the sum of middle values.

Calculation of median---- Individual Observations

Steps

(i) Arrange the data in ascending or descending order of magnitude.(Both arrangement would give the same answer.)

(ii) In a group compound of an odd number of value such as 7, add 1to the total number of value and divide by 2. Thus 7 + 1 would be 8 which divide by 2 gives 4--- the number of the value starting at either end of the numerically arranged groups will be the median value. In a large group the same method may be followed.

In a group in 199 items the middle value would be 100th value.

$$\text{Med.}^* = \text{Size of } \frac{N+1}{2} \text{ th items.}$$

The procedure for determining the median of an even- numbered group of items is not as obvious as above. If there were, for instance, different value in a group , the median is really not determinable since both the 5th and 6th value in the centre . In practice, the median for a group composed of an even number of items estimated by finding the arithmetic mean of the two middle values - that is estimated by finding the arithmetic mean of the two middle values ---- that is , adding the two values in the middle and dividing by two. Expressed in the form of formula, it amounts to;

$$\text{Median} = \text{size of } \frac{N+1}{2} \text{ th items}$$

Illustration

From the following data of the wages of 7 workers compute the median wage:

Wages in Rs. 1100 1150 1080 1120 1200 1160 1400

Solution:

Calculation of Median

S.no.	Wages arranged in ascending order
1	1080
2	1100
3	1120
4	1150
5	1160
6	1200
7	1400

Median= size of N+1th item

2

= 7+1th iem; = 4th item.

2

Size of 4th item=1150. Hence the median wage = Rs. 1150.

Illustration

Obtain the value of median from the following data:

391 384 591 407 672 522 777 753 2488 1490

Solution:

Calculation of median

s.no.	Data arranged in ascending order
1	384
2	391
3	405
4	522
5	591
6	672
7	753
8	777
9	1490
10	2488

Median= size of N+1th item

2

=11 th item; = 5.5th item.

2

Size of 5.5th item= 5th item+6th item ; = 591+672; =1263; = 631.5

2 2 2

Computation of Median - Discrete Series

Steps

1. Arrange the data in ascending or descending order of magnitude.
2. Find out the cumulative frequencies.

3. Apply the formula: Median=Size of N+1

4. Now look at the cumulative frequency Column and find that total which is either equal to N+1 or next higher to that determine the value of the variable corresponding to it that fives the value of median.

Illustration

From the following data find the value of median:

Income:	1000	1500	800	2000	2500	1800
No. of persons:	24	26	16	20	6	30

Solution:

Calculation of median

Income arranged inascending order	**No.of persons (f)**	**c.f.**
800	**16**	**16**
1000	**24**	**40**
1500	**26**	**66**
1800	**30**	**96**
2000	**20**	**116**
2500	**6**	**122**

Median = size of N+1 th item = 122+1 ith item; = 61.5th item.

2 2

Size of 61.5th item= 1500.

Therefore, Median= 1500.

Calculation of Median-Continuous Series

Steps

Determine the particular class in which the value of median lies. Use N/2 as the rank of the median and not {N+1}/2. Some writers have suggested that while calculating median in continuous series 1should be added to total frequency if it is odd (Say 99) and should not be added if it is even figure (say 100). However ,1 is to be added in case of individual and discrete series because specific items and individual values are involved. In

a continuous frequency distribution all the frequencies lose their individuality. The effort now is not to find the values of 1 specific item but to find a particular point on a curve that one value which will have 50 percent of frequencies on one side of it and 50 per cent of the frequencies on the other. It will be wrong to use the above rule. Hence it is N/2 which will divide the area of curve into two equal parts and as such we should use N/2 instead of (N+1)/2 , in continuous series. After ascertaining the class in which median lies, the following formula issued for determining the exact value of median.

$$\text{Median} = L + \frac{N/2 - c.f}{F} \times i$$

It should be remembered that while interpolating the median value in a frequency distribution it is assumed that the variable is continuous and that there is an orderly an even distribution of items within each class.

Illustration:

Calculate median for the following distribution table:

Marks	No.of students
5-10	7
10-15	15
15-20	24
20-25	31
25-30	42
30-35	30
35-40	26
40-45	15
45-50	10

Solution :

Marks	No.of students (f)	c.f
5-10	7	7
10-15	15	22
15-20	24	46
20-25	31	77
25-30	42	119
30-35	30	149
35-40	26	175
40-45	15	190
45-50	10	200

Median= size of N th item = 200; = 100th item

2 2

Median lies in the class interval 25-30

Med.= L + N/2 - c.f x i

F

L= 25; N/2= 100; c.f= 77, f= 42, i= 5.

Med. = 25+ 100-77 x 5; = 25+ 2.74; = 27.74

42

Median = 27.74.

Calculation of Median which Class Intervals are Unequal

When the class intervals are unequal, the frequencies need not be adjusted to make the class intervals equal and the same formula for interpolation can be applied as discussed above.

Mathematical Property of Median:

The sum of the deviation of the atoms from the median ignoring signs is the least. For example, the median of 4,6,8,10,12 is 8. The deviations from 8 ignoring signs are 4,2,0,2,4 and the total is 12. This total is smaller than the one obtained if deviation is taken from any other value. Thus if deviation is taken from 7, values ignoring signs would be 3,1,1,3,5 and the total 13.

17.9 MERITS AND LIMITATIONS OF MEDIAN

Merits

* It is especially useful in case of open end classes since only the position and not the values of item must be known. The median is also recommended if the distribution has unequal classes, since it is easier to compute than the mean.
* Extreme value do not affect the median as strongly as they do the mean. For example, the median of10, 20, 30, 40 and 150 would be 30 whereas the mean 50. Hence very often when extreme values are present in a set of

observations, the median is a median is a more satisfactory measure of the central tendency than the mean.

* In markedly skewed distributions such as income distribution or price distribution where the arithmetic mean would be distorted by extreme values, the median is especially useful. Consequently, the median income for some purpose be regarded as a more representative figure, for half the income earners must be receiving at least the median income. One can say as many receive the median income and as many do not.

* It is the most appropriate average in dealing with qualitative data. i.e. where ranks are given or there are other types of items that are not counted or measured but are scored.

* The value of median can be determined graphically whereas the value of mean cannot be graphically ascertained.

" Perhaps the greatest advantage of median is however, the fact that the median actually does indicate what many people incorrectly believe the arithmetic mean indicates. The median indicates the values of the middle item in the distribution. This is a clear -cut meaning and makes the median a measure that can be easily explained.

Limitations

* For calculating median it is necessary to arrange the data. Other average do not need any arrangement.

* Since it is a position average its value is not determined by each and every observation.

* It is not capable of algebraic treatment. For example median cannot be used for determining the combined median of two or more groups as is possible in case of mean. Similarly the median wage of a skewed distribution times the number of workers will not give the total payroll. Because of this limitation the median is much less popular as compared to the arithmetic mean.

* The median, in some cases, cannot be computed exactly as the mean. When the number of items included in a series of data is even, the median is

determined approximately as the mid-point of the two middle items.

Usefulness

The median is useful for distributions containing open-end intervals since these intervals do not enter its computation. Also since the median is affected by the number rather than the size of item, it is frequently used instead of the mean as a measure of central tendency in cases where such values are likely to distort the mean.

Related Positional Measures

Besides median, there are other measures which divide a series into equal parts. Important amongst these are quartiles, deciles and percentiles. Quartiles are those values of the variate which divide the total frequency into four equal part, deciles divide the total frequency into 10 equal parts and the percentiles divide the total frequency into 100 equal parts. Just as one point divides a series into two parts, three points would divided it into four parts, 9 points into 10 parts, Consequently, there are only 3 quartiles, 9 deciles and 99 percentiles for a series. The quartiles are denoted by symbol Q deciles by D and percentiles by P. the subscripts 1,2,3 etc., beneath Q,D, etc would refers to the particular value that wants to compute. Thus Q1 would denote first quartile ,Q2 second quartile, Q3 third quartile, D1 first deciles, D3 8th deciles, P1 first percentile and P60 60th percentile, etc.

Graphically any set of these partition values divides the area of the frequency curve or histogram into equal parts. If vertical lines are drawn as third quartiles, for example the area of histogram will be divided by these lines four equal parts. The 9 deciles divide the area of the histogram or frequency curve into 10 equal parts and the 99 percentiles divides the area into 1000 equal parts.

In economics and business statistics quartiles are more widely used than deciles and percentiles . The quartiles are the points on the X- scale that divide the distribution into four equal parts . Obviously, there are three quartiles the seconds coinciding with the median. More precisely stated the lower quartiles Q1 is that points on the X - scale such that one- fourth of the total frequency is less than Q1 and three - fourths is greater than Q1. The upper quartiles ,Q3 is

that points on the X-scale such that three- fourths of the total frequency is below Q3 and one - fourth Is above that.

The deciles and percentiles are important in psychological and educational statistics concerning grades , rates, ranks, etc.: they are of use in economics and business statics in personnel work productivity rating and other such situations.

It should be noted that quartiles , deciles .etc ., are not average . they are measures of dispersion. Here only a passing refers is made . the methods of computing these partition values is the same as discussed for median.

Just as quartiles divides the series into 4 equal parts, penniless divide into 5 equal parts. Septiles into 7 equal parts and octiles into 8 equal parts. However these partition values are rarely used in practices.

Computation of quartiles , percentiles, etc.

The procedure for computing quartiles deciles , etc is the same as the median . while computing these values in individual and discrete series we add 1 to N where as in continuous series we do not add 1.

Thus Q1 = Size of (N+1)/4th items (individual observation and desecrates series)

Q1 = size of N/4 (in continuous series)

Q3= Size of 3(N+1)/4th (individual and discrete series)

Q3 = size of 3N/4th items (in continuous series)

D4 = size of 4(N+1)/10 th items (individual observation and desecrates series)

D4 = size of 4N/10th items (in continuous series)

P60 = size of 60(N+1)/100 th items (individual observation and desecrates series)

P60 = size of 60N/100th items (in continuous series)

Determination of Median, Quartiles, etc., Graphically

Median can be determined graphically by applying any of the following two methods:

Draw two ogives - one by 'less than' method and the other by 'more than' method. From the point where both these curves intersect each other, draw a perpendicular on the X-axis. The point where this perpendicular touches the X-axis, gives the value of median.

Draw only one ogive by 'less than' method. Take the variable on the X-axis and frequency on the Y-axis. Determine the median value by the formula : median = size of th item. Locate this value on the Y-axis and from it draw a perpendicular on the cumulative frequency curve. From the point where it meets the ogive, draw another perpendicular on the X-axis and the point where it meets the X-axis is the medium.

17.10 MODE

The mode or the modal value is that value in a series of observations which occurs with the greatest frequency. For example, the mode of the series 3, 5, 8, 5, 4, 5, 9, 3 would be 5, since this value occurs more frequently than any of the others.

The mode is often said to be that value which occurs most often in the data, that is, with the highest frequency. While this statement is quite helpful in interpreting the mode, it cannot safely be applied to any distribution, because of the vagaries of sampling. Even fairly large samples drawn from a statistical population with a single well defined mode may exhibit very erratic fluctuations in this average if the mode is defined as that exact value in the ungrouped data of each sample which occurs most frequently. Rather it should be thought as the value about which the items are most closely concentrated. It is the value which has the greatest frequency density in its immediate neighbourhood. For this reason mode is also called the most typical or fashionable value of a distribution.

The value of the variable at which the curve reaches a maximum is called the mode. It is the value around which the items tend to be most heavily concentrated.

Although mode is that value which occurs most frequently, yet it does not follow that its frequency represents a majority out of all the total number of frequencies. For example, in the election of college president the votes obtained by three candidates contesting for president ship out of a total of 816 votes polled are as follows :

Mr. X 268; Mr. Y 278; Mr. Z 270 : Total 816.

Mr. Y will be elected as president because he has obtained highest votes.

But it will be wrong to say that he represents majority because there are more votes against him (268 + 270 = 538) than those for him.

There are many situations in which arithmetic mean and median fail to reveal the true characteristic of data. For example, when we talk of most common wage, most common income, most common height, most common size of shoe or ready - made garments we have in mind mode and not the provide an accurate reflection of the data due to the presence of extreme items. Median may also prove to be quite unpresentative of the data owing to an uneven distribution of the series. For example, the values in the lower half of a distribution range from, say, Rs. 10 to Rs. 100, while the same number of items in the upper half of the series limit. In such a distribution the median value of Rs. 100 will provide little indication of the true nature of the data.

Both these shortcomings may be overcome by the use of mode which refers to the value which occurs most frequently in a distribution. Moreover, mode is the easiest to compute since it is the value corresponding to the highest frequency. For example, if the data are :

Size of shoes	5	6	7	8	9	10	11
No. of persons	10	20	25	40	22	15	6

Calculation of Mode

Determining the precise value of the mode of frequency distribution is by no means an elementary calculation. Essentially it involves fitting mathematically some appropriate type of frequency curve to the grouped data and determination of the value on the X-axis below the peak of the curve. However, there are several elementary methods of estimating the mode. These methods have been discussed for individual observations, discrete series and continuous series.

Calculation of Mode - Individual Observations

For determining mode count the number of times the various values repeat themselves and the value occurring maximum number of times is the modal value. The more often the modal value appears relatively, the more valuable the measure is an average to represent data.

When there are two or more values having the same maximum frequency, one cannot say which is the modal value and hence mode is said to be ill-defined. Such a series is also known as bimodal or multimodal. For example, observe the following data of income :

Income (in Rs.) 110 120 130 120 110 140 130 120 130 140

Let us find out how Many times each Value occurs :

Size of item	110	120	130	140
	2	3	3	2

Since 120 and 130 have the same maximum frequency, i.e., 3, mode is ill-defined in this case.

Illustration

Calculate the mode from the following data of the marks obtained by 10 students.

s.no	Marks obtained
1	10
2	27
3	24
4	12
5	27
6	27
7	20
8	18
9	15
10	30

Solution:

Calculation of mode

X	Number of times it occurs
10	1
12	1
15	1
18	1
20	1
24	1
27	3
30	1

Since the item 27 occurs the maximum number of times, i.e., 3, hence the modal marks are 27.

Calculation of Mode-Discrete Series

In discrete series quite often mode can be determined just by inspection, i.e., by looking to that value of the variable around which the items are most heavily concentrated. For example, observe the following data :

Size of garment	28	29	30	31	32	33
No. of persons wearing	10	20	40	65	50	15

From the above data we can clearly say that the modal size is 31 because the value 31 has occurred the maximum number of times, i.e. 65. However, where the mode is determined just by inspection, an error of maximum frequency and the frequency preceding it or succeeding it is very small and the items are heavily concentrated on either side. In such cases it is desirable to prepare a grouping table and an analysis table. These tables help us in ascertaining the modal class.

A grouping table has six columns. In column 1 the maximum frequency is marked or put in a circle; in column 2 frequencies are grouped in two's; in column 3 leave the first frequency and then group of the remaining in two's column 4 group the frequencies in three's in column 5 leave the first frequency and group the frequency and group the frequencies in three's and in column 6 leave the first two frequencies and then group the remaining in three's. In each of these cases take the maximum total and mark it in a circle or by bold type.

After preparing the grouping table, prepare an analysis table. While preparing this table put column number on the left-hand side and the various probable values of mode on the right-hand side. The values against which frequencies are the highest are marked in the grouping table and then entered by means of a bar in the relevant 'box' corresponding to the values they represent.

Illustration:

Calculate the value of mode for the following data:

Marks:	10	15	20	25	30	35	40
Frequency:	8	12	36	35	28	18	9

Solution : Since it is difficult to say by inspection as to which is the modal value, we prepare grouping and analysis tables.

X	F	II	III	IV	V	VI
10	8					
15	12	20		56		
20	36		48		83	
25	35	71				99
30	28		63			
35	18	46		81		
40	9		27		55	

Analysis table

Col.no.	10	15	20	25	30	35	40
I			1				
II			1	1			
III				1	1		
IV				1	1		
V			1	1			
VI			1	1	1		
Total	0	0	4	5	3	0	0

Corresponding to the maximum total 5, the value of the variable is 25. Hence modal value is 25.

Calculation of Mode - Continuous Series

Steps

i) By preparing grouping table and analysis table or by inspection ascertain the modal class.

ii) Determine the value of mode by applying the following formula :

$$Mo = L + \frac{\Delta_1}{\Delta_1 + \Delta_2} \times i$$

Where, L = lower limit of the modal class; ?1 = the difference between the frequency of the modal class and the frequency of the pre-modal class, i.e., preceding class (ignoring sings), i.e., |f1 - f2 | ; ?2 = the difference between the frequency of the modal class and the frequency of the post - modal class, i.e., succeeding class (ignoring signs), i.e., |f1 - f2 | ; i = the class interval of the modal class.

$$Mo = L + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times i$$

Where, L = lower limit of the modal class : f1 = frequency of the modal class ; f0 = frequency of the class preceding the modal class; f2 = frequency of the class succeeding the modal class.

While applying the above formula for calculating mode, it is necessary to see that the class intervals are uniform throughout. If they are unequal they should first be made equal on the assumption that the frequencies are equally distributed throughout the class, otherwise we will get are equally distributed throughout the class, otherwise we will get misleading results.

Illustration:

Calculate the mode from the following data:

Marks	No.of students
0-10	3
10-20	5
20-3-	7
30-40	10
40-50	12
50-60	15
60-70	12
70-80	6
80-90	2
90-100	8

Solution :

By inspection the modal class is 50-60

Mo= L + $\frac{?1}{?1+?2}$ x i

L=50; ? 1= (15-12)= 3; ? 2= (15-12)=3; i=10

Mo= 50+ $\frac{3}{3+3}$ x 10; =50+ 5; =55

Mo= 55.

There may be two values which occur with equal frequency. The distribution is then called bio modal. The following is a graph of bimodal distribution :

In a bimodal distribution the value of mode cannot be determined with the help of formula given above. If plotted data produce a bimodal distribution. The data themselves should be questioned. Quite often such a condition is caused when the size of the sample is small: the difficulty can be remedied by increasing the sample size. Another common cause is the use of non-homogenous data. In instances where a distribution is modal and nothing can be done to change it, the mode should not be used as a measure of central tendency.

Mode when Class Intervals are Unequal

The formula for calculating the value of mode given above is applicable only where there are equal class intervals. It the class intervals are unequal, then we must make them equal before we start computing the value of mode. The class interval should be made equal and frequencies adjusted on the assumption that they are equally distributed throughout the class.

Locating Mode Graphically

In a frequency distribution the value of mode can also be determined graphically. The steps in calculation are :

* Draw a histogram of the given data.
* Draw two lines diagonally in the inside of the modal class bar, starting from each upper corner of the bar to the upper corner of the adjacent bar.
* Draw a perpendicular line from the intersection of the two diagonal lines to the X-axis (horizontal scale) which gives us the modal value.

17.11 MERITS AND LIMITATIONS OF MODE

Merits : The main merits of mode are :

* By definition mode is the most typical or representative value or a distribution. Hence, when we talk of modal wage, modal size of shoe or modal size of family it is this average that we refer to. The mode is a measure which actually does indicate what many people incorrectly believe the arithmetic mean indicates. The mode is the most frequently occurring value. If the modal wage in a factory is Rs. 916 then more workers receive Rs. 916 than any other wage. This is what many believe the "average" wage always indicates, but actually such a meaning is indicated only if the average used is the mode.

* Like median, the mode is not unduly affected by extreme values. Even if the high values are very high and the low values are very low we choose the most frequent value of the data to the modal value : for example, the mode of 10, 2, 5, 10, 5, 60, 5, 10, 60 is 10 as this value, i.e., 10 has occurred most often in the data set.
* It value can be determined in open-end distributions without ascertaining the class limits.
* It can be used to describe qualitative phenomenon. For example, if we want to compare the consumer preferences for different types of products, say, soap, toothpaste, etc., or different media of advertising we should complete the modal preferences expressed by different groups of people.
* The value of mode can also be determined graphically whereas the value of mean cannot be graphically ascertained.
* **Limitations :** The important limitations of this average are :
* The value of mode cannot always be determined. In some cases we may have a bimodal series.
* It is not capable of algebraic manipulations. For example, from the modes of two sets of data we cannot calculate the overall mode of the combined data. Similarly, the modal wage times the number of workers will not give the total payroll-except, of course, when the distribution is normal and then the mean, median and mode are all equal.
* The value of mode is not based on each and every item of the series.
* It is not a rigidly defined measure. There are several formulae for calculating the mode is the most unstable average and its value is difficult to determine.
* While dealing with quantitative data, the disadvantages of the mode outweigh its good features and hence it is seldom used.

Usefulness : The mode is employed when the most typical value of a distribution is desired. It is the most meaningful measure of central tendency in case of highly skewed or non-normal distributions, as it provides the best indication of the point of maximum concentration.

Relationship among Mean, Median and Mode

A distribution in which the values of mean, median and mode coincide (i.e., mean = median = mode) is know as symmetrical distribution. Conversely stated, when the values of mean, median and mode are not equal the distribution is known as asymmetrical or skewed. In moderately skewed or asymmetrical distributions a very important relationship

exists among mean, median and mode. In such distributions the distance between the mean and the median is about one-third the distance between the mean and the mode.

Pearson has expressed this relationship as follows :

Mode = Mean - 3 [Mean - Median]

Mode = 3 Median - 2 Mean

and Median = Mode + [Mean - Mode]

If we know any of two values out of the three, we can compute the third from these relationships.

CHECK YOUR PROGRESS

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

Q1. Discuss the various objectives of average ?

_____

_____

Q2. What is meant by mode ?

_____

_____

17.12 LET US SUM UP

Thus, it can be sumarized that Average is an attempt to find one single figure to describe whole of figures. It is a number typical of the whole group. The mean median and mode are the measures of central tendency.

17.13 SUGGESTED READINGS

1 C.R. Kothari (2001) Research Methodology, Methods & Techniques.

2 Black and Champion (1976) Methods & Issues in Social Research.

3 F.N. Kerlinger (1973) Foundations of Behavioural Research.

4. P.R. Young (1969) Scientific Social Surveys and Research.

5. Cohen and Nagel (1984) An Introduction to logic and Scientific Method.

17.14 ANSWERS TO CHECK YOUR PROGRESS

1) a) To get the single value that describes the characteristics of the whole group.

b) To facilitate comparison.

2) The modal value is a value in a series of observation with greatest frequency.

PRESENTATION OF DATA : GRAPHS AND HISTOGRAMS

Structure

18.1 INTRODUCTION

One of the most convincing and appealing ways in which statistical results may be presented is through graphs. Evidence of this can be found in newspapers, magazines, journals, advertisements, etc. There are numerous ways in which statistical data may be displayed pictorially such as different types of diagrams, graphs, and maps. A large variety of graphs are used in practice. Graphs offer a visual representation of the results. It is an abstract representation of a set of objects where some pairs of the objects are connected by links.

Constructing graphs is an art which can be acquired through practice. There are a number of simple rules, adoption, of which leads to the effectiveness of the graphs. For constructing graphs, we make use of graph paper. Two simple lines are first drawn which intersect each other at right angles. The lines are known as coordinate axes. The point of intersection is known as the point of origin or the 'Zero' point. The horizontal line is called the axis of X or 'abscissa' and the vertical line the axis of Y or 'ordinate'. The alternative appellations are Y-axis and X-axis respectively. The whole plotting area is divided into four quadrants. In quadrant I, both the values of X and Y are positive. In quadrant II, Y is positive and X is negative; in quadrant III, both X as well as Y are negative and in quadrant IV, X is positive whereas Y is negative.

					Y				
		II						I	
X’					0				
									X
		III						IV	
					Y’				

18.2 OBJECTIVES

To study the graphs and the histograms in order to look into the differences between the two and to analyze them in detail.

18.3 RULES FOR THE CONSTRUCTION OF GRAPH

The following are the main rules to construct a graph:

* Every graph must have a suitable title which should clearly convey the main idea, the graph intends to portray.
* The graph must suit to the size of the paper.
* The scale of the graph should be in even numbers or in multiples.
* Footnotes should be given at the bottom to illustrate the main points about the graph.
* Graph should be as simple as possible.
* In order to show many items in a graph, index for identification should be given.
* A graph should be neat and clean. It should be appealing to the eyes.
* Every graph should be given with a table to ensure whether the data has been presented accurately or not.
* The test of a good graph depends on the case with which the observer can interpret it. Thus economy in cost and energy should be exercised in drawing the graph.

However, here we shall discuss only some important types of graphs which are more popular. Broadly, the various graphs can be divided under the following two heads:

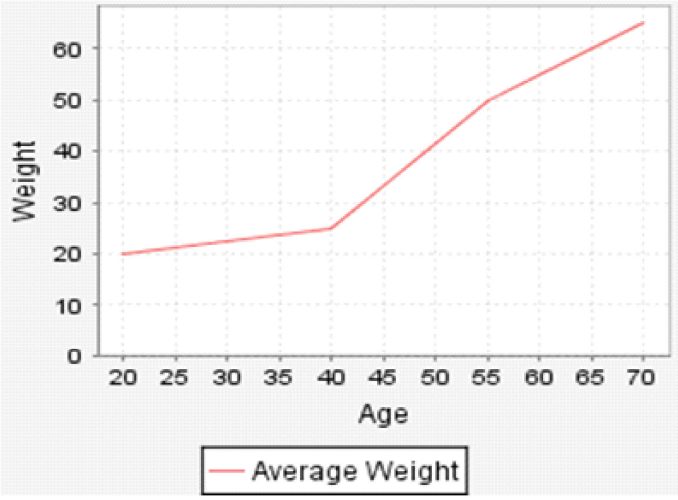
A : Graphs of time series, and

B : Graphs of frequency distributions.

18.4 GRAPHS OF TIME SERIES OR LINE GRAPHS

The technique of graphic representation is extremely helpful in analyzing change at different points of time. On the X- axis, we generally take the time and on the Y- axis the value of the variable and join the various points by straight lines. The graph so formed is known as the line graph. Such graphs are mostly used in practice. They require the least technical skill and at the same time enable one to present more information of a complex

nature in a perfectly understandable form. A line plot can be used as an initial record of discrete data values. The range determines a number line which is then plotted with X's for each data value. A line graph plots continuous data as points and then joins them with a line. Multiple data sets can be graphed together, but a key must be used. A line graph is a way of representing two pieces of information, which is usually related and vary with respect to each other.



LINE GRAPH

18.5 Graphs of one variable

When only one variable is to represented, on the X -axis measure time and on the Y - axis the value of the variable and plot the various points and join them by straight lines. The fluctuation of this line shows the variations on the variables, and the distance of the plotting from the base line of the graph indicates the magnitude.

18.6 Graphs of two or more variable

If the unit of the measurement is the same, one can represent two or more variables on the same graph. This facilitates comparison. However, when the number of variables is very large, (say exceeding five or six) and they are all shown on the same graph, the chart becomes quite confusing because different lines may cut each other and make it difficult to understand the behavior of the variables. Therefore, when two or more variables are

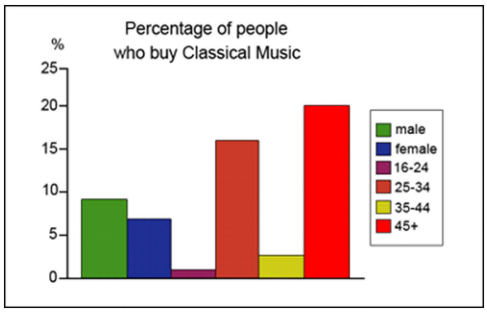
shown the same graph, it is desirable to use thick, thin, broken, dotted lines, etc., to distinguish between the various variables.

18.7 Graphs having two scales

If two variables are expressed in two different units, then one will have two scales - one on the left and the other on the right. To facilitate comparison, each scale is made proportional to the respective average of each. The average values of both the variables are kept in the middle of the graph, and then scales are determined.

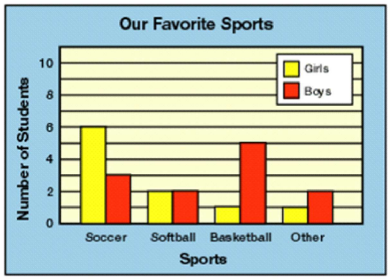
18.8 Bar Graph

A bar graph displays discrete data in separate columns. Categories are considered unordered and can be rearranged alphabetically, by size, etc. A graph that uses vertical or horizontal bars to represent numerical data. A bar graph compares amounts in a single time period. For example, a bar graph could show the populations for various cities; New York, California, Texas.



BAR GRAPH

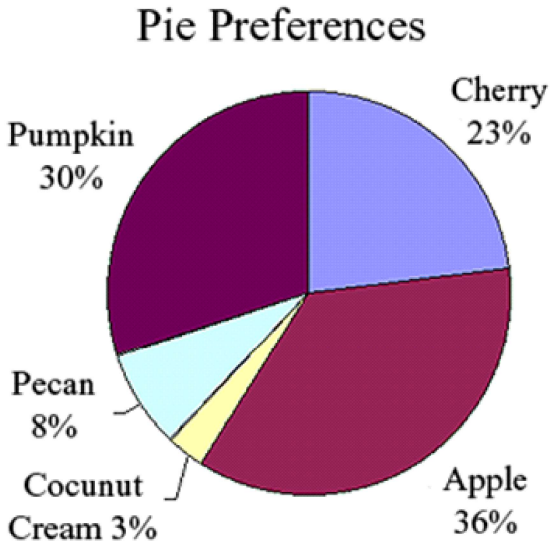
A double bar graph can be used to compare two data sets. A graph that uses pairs of bars to compare information.



DOUBLE BAR GRAPH

18.9 Circle (Pie) Graph

A circular graph that separates each category into a piece of the whole. The pie pieces should equal 1 or 100%. A pie graph displays qualitative data in the form of a pie. Each slice of pie represents a different category.



18.10 Band Graph

A band graph is a type of line graph which shows the total for successive time periods broken up into subtotals for each of the component parts of the total. In other words, the band graph shows how and in what proportion the individual items comprising the aggregate are distributed. The various component parts are plotted one over the other and the gaps between the successive lines are filled by different shades, colour, etc. so that the chart has the appearance of the series of bands. It is especially useful in dividing total costs into components costs, total sales into department or district or individual salesman's sales, total production by nature of commodity, states, plants or industries and other such relationships.

18.11 Pictographs

Pictographs are very popularly used in presenting statistical data. They are not

abstract presentations such as lines or bars but really depict the kind of data we are dealing with. Pictures are attractive and easy to comprehend and as such this method is particularly useful in presenting statistics to the layman. When pictographs are used data are represented through a pictorial symbol that is carefully selected. While constructing a pictograph the following points should be kept in mind:

The pictorial symbol should be self-explanatory. If we are telling a story about aeroplane, the symbol should clearly indicate an aeroplane. The following points should be kept in mind while selecting a pictorial symbol:

* A symbol must represent a general concept (like man, woman, child, bus) not an individual of the species (not Hitler, Akbar, or Dr.sharma's car).
* A symbol should be clear, concise and interesting.
* A symbol must be clearly distinguishable from every other symbol.
* A symbol should suit the size of paper, i.e. it should be neither too small nor too large.
* Last, but not the least, an artist should use the principles of a good design established by the fine and applied arts when drawing a pictorial symbol.

18.12 USES OF GRAPHS

A graph refers to the plotting of different valves of the variables on a graph paper which gives the movement or a change in the variable over a period of time. Graphs are extremely useful because of the following reasons:

They give a birds- eye view of the entire data and, therefore, the information presented is easily understood. It is a fact that as the number and magnitude of figures increases they become more confusing and their analysis tends to be more strenuous. Pictorial presentation helps in proper understanding of the data as it gives an interesting from to it. The old saying 'A picture is worth 10,000 words' is very true. The mind through the eye can more readily appreciate the significance of figures in the form of pictures than it can follow the figures themselves.

Graphs are very much used by the statistician and the research worker in analysis. In fact, these days it is difficult to find any research work without the graphic support. For constructing a graph we generally make use of graphs paper. In other words, a graph represents mathematical relationship between two variables. For representing frequency distributions and times series, graphs are more appropriate than diagrams.

18.13 Advantages of Graphs

The presentation of statistics in the form of graphs facilitates many processes in economics. the main uses of graphs are as under:

* Attractive and Effective presentation of Data: The statistics can be presented in attractive and effective way by graphs. A fact that an ordinary man can not understand easily, could understand in a better way by graphs. Therefore, it is said that a picture is worth of a thousand words.

* Simple and Understandable Presentation of Data: Graphs help to present complex data in a simple and understandable way. Therefore, graphs help to remove the complex nature of statistics.

* Useful in Comparison: Graphs also help to compare the statistics. IF investment made in two different ventures is presented through graphs, then it becomes easy to understand the difference between the two.

* Useful for Interpretation: Graphs also help to interpret the conclusion. It saves time as well as labour.
* Remembrance for long period: Graphs help to remember the facts for a long time and they cannot be forgotten.
* Helpful in Predictions: Through graphs, tendencies that could occur in near future can be predicted in a better way.
* Universal utility: In modern era, graphs can be used in all spheres such as trade, economics, government departments, advertisement, etc.
* Information as well as Entertainment: Graphs help us in entertainment as well as for providing information. By graphs there occurs no hindrance in the deep analysis of every information.
* Helpful in Transmission of Information: Graphs help in the process of transmission as well as information of facts.
* No Need for training: When facts are presented through graphs there is no need for special training for these interpretations.

18.14 Limitations

Following are the main drawbacks/ limitations of graphs.

* Limited Application: Graphic representation is useful for a common man but for an expert, its utility is limited.
* Lack of Accuracy: Graphs do not measure the magnitude of the data. They only depict the fluctuations in them.
* Subjective: Graphs are subjective in character. Their interpretation varies from person to person.
* Misleading Conclusions: The person who has no knowledge can draw misleading conclusions from graphs.
* Simplicity: Graph should be as simple as possible.
* Index: In order to show many items in a graph, index for identification should be given.

18.15 Graphs of Frequency Distribution

Histogram

Out of several methods of presenting a frequency distribution graphically, histogram is the most popular and widely used in practice. A histogram is a set of vertical bars whose areas are proportional to the frequencies presented. According to Opermann, a histogram is a bar chart or graph showing the frequency of occurrence of each value of the variable being analyzed. A histogram in another kind of graph that uses bars in its display. This type of graph is used with quantitative data. Ranges of values, called classes, are listed at the bottom, and the classes with greater frequencies have taller bars. In statistics, a histogram is a graphical representation showing a visual impression of the distribution of data. It is an estimate of the probability distribution of a continuous variable and was first introduced by Karl Pearson.

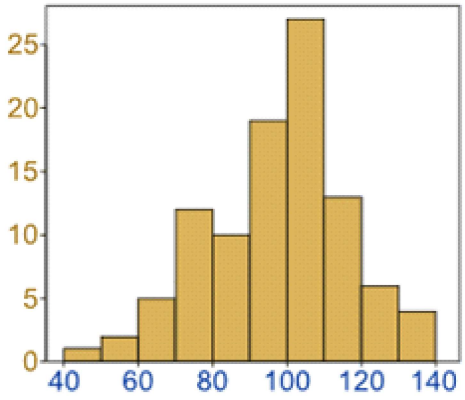
A histogram consists of tabular frequencies, shown as adjacent rectangles, erected over discrete intervals (bins), with an area equal to the frequency of the observations in the interval. The height of a rectangle is also equal to the frequency density of the interval, i.e., the frequency divided by the width of the interval. The total area of the histogram is equal to the number of data. A histogram may also be normalized displaying relative frequencies. It then shows the proportion of cases that fall into each of several categories, with the total area equaling.

18.16 Etymology

The etymology of the word histogram is uncertain. Sometimes it is said to be derived from the Greek histos 'anything set upright' (as the masts of a ship, the bar of a loom, or the vertical bars of a histogram); and gramma 'drawing, record, writing'. It is also said that Karl Pearson, who introduced the term in 1895, derived the name from "historical diagram".

While constructing histogram the variable is always taken on the X- axis and the frequencies depending on it on the Y- axis. Each class is represented by a distance on the scale that is proportional to its class interval. The distance for each rectangle on the X- axis shall remain the same in case the class intervals are uniform throughout. If they are different, they vary. The Y- axis represents the frequencies of the class which constitute the height of

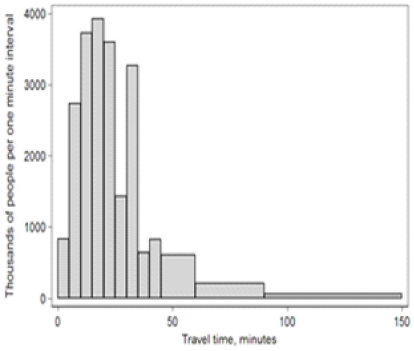
its rectangle. In this manner, we get a series of rectangles each having a class interval distance as its width and the frequency distance as its height. The area of the histogram represents the total frequency as distributed throughout the classes.



HISTOGRAM

For example,

The U.S. Census Bureau found that there were 124 million people who work outside of their homes. Using their data on the time occupied by travel to work. Table 2 below shows the absolute number of people who responded with travel times "at least 15 but less than 20 minutes" is higher than the numbers for the categories above and below it. This is likely due to people rounding their reported journey time.



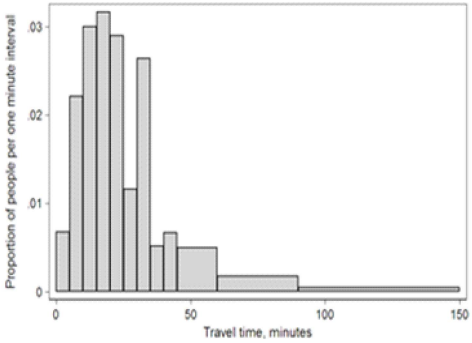


Table- 1 **Table -2**

The histogram is most widely used for graphical presentation of a frequency distribution. Histograms are used to plot density of data, and often for density estimation:

estimating the probability density function of the underlying variable.

The technique of constructing histogram is given below

1. For distributions having equal class intervals

2. For distributions having unequal class intervals

When class intervals are equal, take frequency on the Y- axis, the variables on the X- axis and construct adjacent rectangles. In such a case, the height of the rectangles will be proportional to the frequencies.

When class intervals are unequal, a correction for unequal class intervals must be made. The correction consists of finding for each class the frequency density or the relative frequency density. The frequency density is the frequency for that class divided by the width of that class. A histogram constructed from these density values would have the same general appearance as the corresponding graphical display developed from equal class intervals.

Thus, Graphs and Histograms are a powerful and effective media for presenting statistical data. Histograms are a specialized type of bar graph used to summarize groups of data. Graphs are usually used to display "categorical data", whereas Histograms on the other hand are usually used to present "continuous data", that is data that represents measured quantity.

CHECK YOUR PROGRESS

Note : (a) Write your answers in the space given below.

(b) Check your answers with those given at the end of the lesson.

1. What is meant by the term Graph ?

_____

_____

2. Briefly discuss Bar Graph ?

_____

_____

18.17 LET US SUM UP

Thus it can be summariazed that most convixcing and appealing ways in which statistical data can be presented in through graps. The graphs are of many types like Bar Graph, Line graph, Pie Chartes, Histogram etc.

18.18 SUGGESTED READINGS

1 C.R. Kothari (2001) Research Methodology, Methods & Techniques.

2 Black and Champion (1976) Methods & Issues in Social Research.

3 F.N. Kerlinger (1973) Foundations of Behavioural Research.

4. P. V. Young (1969) Scientific Social Surveys and Research.

5. Cohen and Nagel (1984) An Introduction to logic and Scientific Method.

18.19 ANSWERS TO CHECK YOUR PROGRESS

1) Graph represents a visual representation of the results.

2) A Bar graph displays discrete data in separate column.

*****