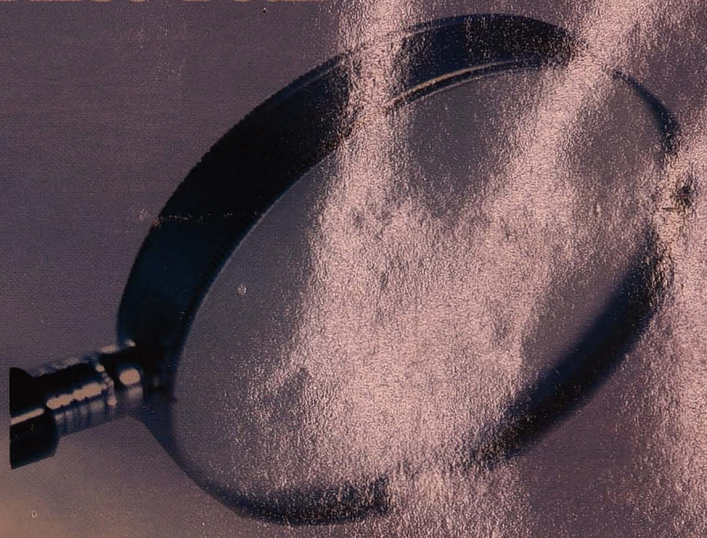
MADURAI KAMARAJ UNIVERSITY

(University with Potential for Excellence)

M.A.
(CRIMINOLOGY AND POLICE ADMINISTRATION)

First Year



Paper - IV

RESEARCH METHODOLOGY

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SYLLABUS

RESEARCH METHODOLOGY

Unit - 1 : Research Methodology - Introduction

Nature and definition - scientific attitude - criminological research - Types of research designs - experimental, ex-post factor (one group and two group), time series, classic and quasi-experimental. Research problem - formulation and the theoretical justification for the problem.

Unit - 2 : Hypothesis

Hypothesis - definition - types formulation (through review of literature) testing of hypothesis in research - its importance, two main types of error - type I and type II, Variable selection. Data collection - different types of data - modes of collection - observation - Interviews (scales, ethnography, questionnaires and schedules) Surveys.

Unit - 3 : Measurement Scales :

Types of scale, other psychological inventories, sociometric instruments**. How to construct - errors in construction.

Sampling - definition - Population and sample, types (targeted - Probability and non-probability techniques), advantages of sampling, requirements of a good sample Criteria for selecting sampling design, sampling frames. Probability sampling probability distributions -theoretical explanation, types - cluster, simple random, systematic, stratified, multiphase. Non - probability sampling systematic, quota sampling, sequential, snowball, purposive, incidental.

Unit - 4 : Longitudinal Studies

Longitudinal studies, sampling techniques used in observation - time sampling, event sampling, situation sampling.

Reliability and validity - errors in measurement, methods of estimation, types of reliability and validity place effect, criterion problems, selection bias.

Unit - 5: Data Analysis :

Classification of data; coding and tabulation, Report Writing, Ethics in Criminal Justice Research : Confidentiality, Computerisation of data in the Criminal Justice System.

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RESEARCH METHODOLOGY

IN

CRIMINOLOGY

CONTENTS

Unit -1

Nature and Definitions of Research

Introduction

The physical world comprises plenty of facts to be explored. For common sense understanding these facts are to be the cause or consequence of events disclosing the mystery of the natural and social phenomena. But these areas are to be explored, more than our common sense understanding by plunging deep into the matter. This sort of investigation is possible by collecting as much information as possible and correlating between different units / elements that form a part of those phenomena. This act of inquiry, the effort of inquest, is referred to as research. The inquiry is performed with systematic social and mathematical tool application and is scientifically proved. This procedure is termed as methodology. Hence, research methodology is a subject that familiarize the students to the basic logic and research procedures and expectations. The development of any science depends on the use of improved research techniques in that field. A discipline is considered to be more scientific if it has developed intensive research methods.

In this Unit, the meaning, objectives and characteristics of research; deductive and inductive methods of reasoning and the features and the features of scientific methods of inquiry are discussed.

Objectives

The following aspects of the nature of research and its definitions, scope, divisions are discussed in this Unit.

- Definitions and meaning of research
- Knowledge of scientific techniques
- Scientific Research Method
- Various types of Research methods
- Different Stages in Research Methodology

Unit Structure

Introduction

Objectives

1.1 Definition and Meaning of Research

The term 'research' is derived the French word 'Researcher' meaning to search back. There are many definitions for research. Let us look at the following important definitions to know its meaning.

Social Research may be defined as "a scientific understanding which, by means of logical and systematized techniques, aims at 1) discovering new facts or verify and test old facts: (2) analysing their sequences, inter - relationship, and casual explanations which were derived within an appropriate theoretical frame of reference" (3) develop new scientific tools, concept and theories which would facilitate reliable and valid study of human behavior. A researcher's primary goal - distant or immediate - is to explore and gain an understanding of human behavior and social life, in order to extend, correct, or verify knowledge and to know whether that knowledge aids in the construction of a theory or in the practice of an art" - Pauline V. Young.

The above definition shows that research is the scientific study of something in order to solve a problem. It seeks to find explanation to unexplained phenomena, to clarify the doubtful, and correct the misconceived facts of life. Since research involves scientific

investigation, the meaning of research will be made clear in this lesson which deals with scientific methods of inquiry.

Research has the following three chief objectives:

1.2 Objectives

1) To explore facts, find out immediate solutions to problems mainly at methodological levels and organize facts and critically appraise the existing concepts.

2) To understand (explain) a problem, control or manipulate the factors and variables that work for or against the desirable outcome and also to predict the problem.

3) To develop concepts, theories and lay down principles that can be made use of for the ordering and prediction of events within a particular sphere.

1.3 Characteristics of Research

1) Research is a scientific method used for solving problems.

2) Research emphasizes upon the development of generalizations, principles and theories. These generalizations, principles or theories are based on quantified and verified data. With the help of these theories or principle, the researcher is able to explain and predict certain events.

3) Research stresses on prediction of future occurrences. Explanation and predictions are the two domains of science.

4) Research is based on observation or empirical evidence. Data are collected by the use of sophisticated and precise instruments and analysed by scientific techniques. There is therefore, no guess work possible or allowed in scientific research.

5) Research involves gathering new data or using existing data for a purpose. New data are collected if the researcher intends to confirm a statement already made or the existing data would be utilized if the researcher would like to find out something different from what has already been done. It is here the review of research literature becomes relevant.

Check Your Progress

1. What are the characteristics of research procedure?

6) Research uses carefully designed procedure for data collection and applies rigorous analysis. Standardized tools are used for data

collection. If a new tool is constructed and used, care should be taken to establish its reliability and validity.

7) Research requires expertise. Rigorous methodological training is necessary for doing scientific research. The researcher must have thorough knowledge of what not to do.

8) Research achieves objectivity by suppressing bias and emotion. Objectivity is the hall mark of any scientific enterprise. But, in social science cent percent objectivity cannot be achieved.

9) Research should be done patiently and without hurry.

10) Research sometimes requires disputing certain beliefs. Researcher is supposed to say what he wants to say without any reservation or inhibition. Without fear or favor he must approach any issue and come out with his frank views.

11) Research should define, the terms clearly, recognize the limiting factors, describe the procedures in detail, document the references and state the results objectively.

12) Research is finally carefully recorded and reported, it is always reported in simple language and in such a manner that the reader has no difficulty in understanding them.

The above characteristics of research show that research is a more systematic, activity directed towards discovery and the development of an organized body of knowledge. So it may be concluded that research is a scientific process aimed at finding solution to problems. Research as a scientific process comprises a definite sequence of procedure involving five major steps viz. (i) formulation of the problem (ii) description of the design of studies; (iii) presenting the methodology rationale; (iv) analyzing the data and presenting the results; and (v) interpreting the results and drawing conclusions.

All these five steps would be found in any scientific research. Thus, it can be said that research is not a haphazard activity. It is a planned activity involving a systematic process having for it a definite goal to reach. In its attempt to solve the problem neither objectivity is sacrificed nor the scientific temper is lost in the process.

1.4 Science and Its Divisions

The term Science' is derived from the Latin root word 'Scientia' which means knowledge. Science denotes systematic knowledge and organized study of facts. W.C. Dampier defines Science as 'Orderely knowledge of natural phenomena and the rational study of the relation between concepts in which those phenomena are expressed'. In our common understanding science is a body of systematically organized factual knowledge which is obtained by the use of scientific method. Science is always analytical and has practical value. Science is verifiable. Scientific findings may not be absolute because science is self corrective in nature. To be precise, we may say that science is the procedure for answering questions and solving problems.

Empirical sciences are divided into two broad categories- namely natural sciences and social sciences. The former is concerned with the organic matters while the latter (social sciences) studies the structure and functions of human behavior. Social sciences deal with human values and behavior patterns. Physical sciences deal with concrete casual relationship.

On the basis of their utility value one may identify two types. They are pure science and applied science. Pure research usually aims to understand and explain the nature of phenomena. It is conducted for its own sake. It satisfies the craving of man to learn. Pure science is the search for the truth about different types of events for the purpose of obtaining knowledge. Applied 'science' on the other hand gathers knowledge and tries to apply it to practical purposes. It aims to control the events. When scientific knowledge gained in uses for the purpose of development of different sectors of life and industry, it is called applied science.

Science may also be classified as positive and normative sciences. Positive science studies facts without any distortion. They are concerned with objective truth without any basis. They disclose the laws governing the natural phenomena that are not influenced by personal or social values. Physics, Chemistry, Biology and Astronomy are examples for positive sciences. The normative sciences set up

norms for the judgment of phenomena. They differentiate between the good and the bad. Normative sciences make subjective evaluation. They are likely to be influenced by values because they are in search of truth, morality and goodness which differ from person to person. Social sciences, ethics and aesthetics are examples for normative sciences.

1.5 Scientific Attitude

In the process of scientific development, one may identify four successive stages. They are as follows.

i. The Classificatory Order

The scientist, after collecting as many facts, as possible, arranges them on the basis of some criteria, like its quality, quantity, content or period. The classification may differ according to the plan and purpose of the researcher. Data classification determines the quality of a research work.

ii. The Causal Order

Scientific inquiry should give explanation of facts and events on the basis of its cause and effect. Establishing casual relationship is essential in applied sciences. This is often expressed in the statement of hypothesis of a research work.

iii. Mathematical Order

All the modern sciences make use of mathematical applications. Mathematical expressions provide clear and precise details about acts. It is easier to understand the relationship between elements. Mathematical order plays an important role in modern quantitatively sciences. However in descriptive approaches, application of mathematics is rarely used.

Check Your Progress

2. What are the different types of science?

iv. The Order of Theories

Theory explains a number of concepts relating to a phenomena, which leads to generalizations and general laws. Generally various theories follow each other by way of anti-thesis or synthesis.

1.6 Scientific Method

The scientific procedure by which science generates a body of knowledge is referred to as scientific method. The procedure has tools,

techniques and methods to be followed during investigations. Tools means the conceptual instruments used in scientific inquiry. Techniques are the ways of accomplishing the objectives. Scientific method is the way in which one can test opinions and impressions. It refers to the specific steps taken in the pursuit of truth by logical considerations. Encyclopedia Britannica gives the definition as follows: "Scientific method is a collective term denoting the various processes by the aid of which the sciences are built up. In a wide sense, any method of investigation by which scientific or other impartial and systematic knowledge is acquired" is called scientific method

Scientific method has three important steps namely, observations, hypothesis and verification. These steps help scientific method to be progressive and self corrective. According to the nature and objective of the science, scientific methods may adopt either of the two following methods. One is technical method that depends on accurate data and leads to accurate laws. The second one is logical method. Logic is the science of reasoning. Reasoning consists of arriving at conclusions from certain premises. The process of deducing conclusions from a premise is called inference. A valid inference is the one in which the conclusion follows reasonably from the premise.

i. Limitations of Scientific Method

Although systematic procedures make research, scientific method has certain limitations.

a. Scientific explanations are never complete. The conclusions arrived at by scientific method are not final because yet more facts are to be disclosed after a conclusion has been arrived at.

b. Scientific judgment is difficult when situations warrant immediate action.

c. The growth of scientific method is undermined by certain socio-cultural aspects like superstitions, beliefs and mysteries.

d. Sometimes, even the use of highly developed statistics may be irrelevant and inconclusive.

r. Sciences have limited scope of their own field. Each science is concerned with a particular area and is based on certain assumptions.

Check Your Progress

State the limitations of science.

The various scientific methods used in social science research are explained in the next sections.

The social sciences deal with human behavior. Hence the applications of scientific methods in social sciences have to face a number of difficulties. Firstly, as human behavior is complicated and unpredictable, it is difficult to categories human behaviour since the researcher himself is a human being. The study of human behaviour is likely to be biased and distorted. Thirdly, there are several aspects in human behaviour, which are psychological in nature. They are not amenable for measurement. Fourthly, human behaviour is not uniform. Individuals do not behave in the same way in similar situations. Therefore generalization is very difficult. Fifthly "in social sciences, reliable scientific data cannot be collected and human behavior cannot be experimented."

Deductive – Inductive methods are recognized as scientific methods. Empirical research employs these two methods in scientific knowledge seeking process.

ii. Deductive Method

Deductive method is a traditional method of understanding. The traditional method used by Aristotle was known as syllogism or deductive reasoning. It referred to going from generalization to particular. For example, Aristotle's syllogism contained three premises; a major premise, a minor premise and a conclusion.

Major Premise	Broken families are a major cause for juvenile delinquency
Minor premise	Sundar's parents are divorced.
Conclusion	Therefore Sundar has developed delinquent attitude

The major premise is metaphysical truth or an already established dogma. The minor premise is a particular or specific case or an individual phenomenon. The conclusion is deduced or derived from the relationship between the two premises. This is deductive method of reasoning.

iii. Inductive Method

Francis Bacon introduced a new method of reasoning called inductive method. It refers to going from examples to generalizations. For example

Major premises	Mani scores high marks in his class,
Minor Premise	Mani is disciplined
Conclusion	All those who are disciplined score high marks.

Later on, John Dewey combined the deductive and inductive methods and brought about the deductive - inductive method of reasoning, which is known as the scientific method. Dewey's scientific method has the following elements:

a. Identification of the problem and defining it both theoretically and operationally

b. Formulation of hypothesis

c. Collection, organization and analysis of data

d. Formulating of conclusions

e. Verifications, rejection or modifications of hypotheses by testing them in specific situations

Scientific method avoids the defects of both deductive and inductive methods of reasoning.

1.7 Features of Scientific Method of Inquiry

The scientific method of inquiry has the following features.

i. Reliance on Empirical Evidence

The scientist believes that the sole source of knowledge is experience, i.e., data of events and that there are no universal and necessary truths from which valid existential inference can be drawn. One who follows the method of inductions is called 'empiricist' and one who follows the method of deduction is called 'rationalist'. The question that arises here is whether a scientist is an empiricist or a rationalist. The answer is that the scientist is both an empiricist and a rationalist. A scientist is to be compared to a bee which is better than either a spider or an ant by selectively gathering the pollen and

Check Your Progress

4. What are the features of scientific research?

transforming it into honey. Both induction and deduction should mingle in an actual science process.

ii. Use of Relevant Concepts

Concepts are logical abstractions created from sense impressions and experience. These are the premises of a scientific approach. Scientific procedures consist in manipulations of concepts so as to enrich knowledge.

iii. Commitment to Objectivity

Objectivity means repeated observations of a phenomenon by the same observer or by different observers and must yield constant data. Scientific inquiry has a commitment to a high degree of objectivity.

iv. Ethical Neutrality

The researcher must be **smart** willing to listen to every suggestion but determined to judge by himself. He should not be biased by appearances, have no favorite hypothesis, be of no school of thought, and have no master. Truth should be his primary ©bjeettu-m.,

v. Predictions based on Probability

Predictions about phenomenon must stand on the solid basis of the trend repeatedly observed and the probability that the very same trend would manifest itself in terms of some concrete results

vi. Generality

The researcher discovers the thread of uniformity under the surface level of diversity. Then, a logical class is constructed and finally a descriptive generalization is formulated about the class and the observed pattern. It is this generality which in turn **leadsto** formulation of theories.

vii. Public Methodology

A scientist is obliged to make known to the public how he has arrived at the conclusions. He should expose his own methods and conclusions to critical enquiry. Criticism is the very life hood of science. Public methodology affords testing of conclusions through replications.

Research methodology has undergone difficulty in arranging for the classification of research methods, into some universally accepted categories. The distinction among different types of study is not clear -cut. Yet, the need for formulating appropriate research design has made the classification of research essential. Different authors have classified research in different ways. There are very many types of research methods such as inter- disciplinary type of research methods, evolutionary or genetic method, historic, experimental, explorative research, pure research, applied research, action research model building research, library research, individual research, group research methods etc.

The purpose of all research methods is to find out answers to questions raised by scientists or decision makers. The problem of researcher is to determine the nature of the enquiry. A brief summary of different types of research is given.

1.8 Objectives of Research in Social Sciences

According to Pauline Young the purpose of social research is to understand and analyze the social life of human beings. Social research examines the growth and decay of changes and their effects in the society that human beings undergo while engaged in social life. The aim of social research is to study the nature of the society. This study is theory based and meant for understanding the nature of the society. It is not meant for imposing restrictions on the activities of the society.

1.9 Types of Research Designs

The most important research designs are briefly discussed here under.

i. Inter - Disciplinary Approach

Inter- disciplinary approach is, a technique of research in which two different subjects are brought under a research program. It is thus a comparative or co- ordinate research in which the experts of different disciplines pool their knowledge together for the purpose of finding explanation to any problem. This approach is becoming popular now because all the spheres of knowledge will have to merge at some stage

or other., e.g. A study of the impact on poverty and unemployment on crime rate in Madurai City during the period of 2001-2010

ii. Evolutionary or Genetic Method

The method attempts to support the thesis of organic development according to the fixed stage. In social anthropology, this method is frequently employed to show the evolutionary stages and forms of social institutions. This can be seen in the anatomical structure of animals and plants at different stages. In the case of social institutions like marriage and family, various stages may be identified. Similarly the economic system of man has passed through a number of stages from nomadic to pastoral, to agricultural and industrial economy. Such stages are traced from the genesis to the present period in an evolutionary manner in this method.

iii. Historical Method

Historical approach is one of the important approaches to research. A research done by the following historical approach is termed as historical research.

History is a meaningful record of Man's achievements. It is an integrated account of the relationship between events, times and places. It may be directed towards an individual, an idea, a movement or an institution. The history of Indian Freedom Struggle can be cited as an example.

Historical method was found in the middle of 19th century through the writings of German Historical School. This School insists on past knowledge as a pre- requisite for present knowledge. Every event has a history and a development that are related to the present. Historical method is the induction of principle through research into the past and the social forces which have shaped the present. The researcher who adopts historical methods should study the cause-effect relation of historical events. He must be able to find out the relation between events and environment.

Check Your Progress

5. Explain the historical method of scientific research.

Historical method has its own limitations. It is difficult to obtain relevant facts, as the researcher ventures into remote past. Secondly, records are not kept in order and not easily available. It

requires great deal of patience for the researcher to find accurate facts. Another limitation is that the facts have to be taken in the simple frame of the phenomena studied without any diversions. Otherwise real significance will be lost. Due to time lag, rechecking, verification or follow up is not possible. Therefore, great care has to be taken in collection and interpretation of data in historical method.

There are two views about historical research. According to the first view, historical research is a scientific research. The second view is that there is no scope for science as regards historical data. The first is a positive view and the second is negative view. It involves very intensive use of library material. Only such problems as are based on historical records can be investigated by following this approach. The research following this approach is known as historical research.

a. Advantages

Historical approach is useful in so far as the research problem depends on past data. For solving certain problems past information is necessary. The researcher in such cases will have to fall back upon historical data.

i) Historical data is not repeatable under any circumstances and, therefore historical approach is useful to researchers whose problems depend up in historical observations.

ii) There are problems, which cannot be studied by any other approach except **by historical** approach. Therefore, historical approach fills a big gap of making the research and also meaningful on the problems that would otherwise have remained unexplored.

b. Limitations

1. Those who follow this approach tend to over generalize their results.
2. There is a possibility of subjective interpretations in historical approach.
3. There is no scope for comparing the past to the present because a past situation might have been influenced by socio - economic and political factors, which do no longer exist.

iv. Descriptive Method

Descriptive method is simple and can be adopted to study various social problems. This method involves collection of data and interpreting causal connections between facts. This method is common in social sciences where classification is required. This method is useful when the problem is capable of being described, such as description of the tribal community, and description of customs of a specific group. Descriptive method will be more scientific if the data are accurate, objective and quantifiable. Descriptive method makes comparison between one situation and another and between different aspects or the same situations. Situational comparison is an essential element of this method. The researcher must have a good sense of judgment and imaginations to make sensible and fruitful comparisons. The researcher should interpret the data to explain the issue studied. Descriptive method must provide scope for checking. It should have three important aspects. 1) an accurate and adequate bibliography relating to the problem studied 2) an elaborate methodology for the collection and analysis of facts and 3) a list of unsolved but relevant issues encountered by the investigator.

Descriptive method seeks to describe a field or a problem. This method seeks to apply existing theories to given situations and get explanations for the existing phenomena.

a. Advantages

1. Descriptive approach helps the researcher to verify laboratory conclusions in field investigations.
2. By using this approach, the researcher gains new insights into other aspects of the problems which otherwise may not be possible.
3. The researcher in this approach comes into close contact with the respondent. This helps him to elicit precious information from the respondent about the problem under study.

b. Limitations

1. Descriptive approach will be successful if only there is perfect co-operation between the researcher and the respondent.
2. This approach is a time consuming process.

3. Inexperienced researchers can not follow this method.

This method is essentially creative and rests on the investigator's ability to organize facts and present them. The historical facts are neglected by way of describing the present. The statistical tools used in this method should be carefully handled as not to exaggerate facts.

v. Experimental Research

Experimental approach involves the study of causal relations. In social sciences experiment under controlled conditions is difficult. It is a way of hypothesis testing. After the experiments, the researcher proposes a tentative answer for hypothesis and confirms or rejects it in the light of the controlled variable relationship that he has observed.

An experiment involves the comparison of effects of a particular treatment with that of a different treatment or of no treatment. In a simple conventional experiment, reference is usually made to an experimental group and a controlled group. The experimental group is exposed to the influence of the factor under consideration; the controlled group is not. Observations are made then to determine what difference appears or what change or modification occurs in the experimental group as contrasted with the controlled group.

The experiment conducted by the researcher should have both internal and external validity. They are explained as follows.

vi. Internal Validity

To the extent, the observed occurrences are not influenced by extraneous factors, Are measures of the internal validity of the experiment. Let us assume that there are two groups of prison inmates. One group is given orientation in yoga everyday whereas the other group is not given any orientation in Yoga. The former is the experimental group and the latter is the controlled group Un case, the attitude of the experimental group is reversed through regular yoga practices that the group was subjected to then, we can . say that the experiment in this case has an impact on the experimental group. Here the regular yoga practice is an extraneous factor, which has influenced the group's behavior.

vii. External Validity

To the extent, the systematic relationship that have been identified, isolated and measured they can be generally used to predict relationship outside the experimental setting. This is a measure of the external validity of the experiment.

If the researcher is able to predict by using this generalization ' higher the level of orientation on yoga practices greater will be the degree of attitudinal change on the part of the prison inmates. This means yoga may be applied to more prisoner groups. Then we can say that the experiment has external validity. The same is true with regard to extending the facilities of education and skill training to the prison inmates.

a. Advantages

i) Experimental approach is reliable as it provides scope for accurate observation of the phenomenon under study

ii) It is an approach, which provides scope for studying the problem from practical point of view.

iii) It will have greater applicability in the study of developing countries.

b. Limitations

i) Experimental approach is a complicated approach so far as social science research is concerned.

ii) It requires lot of training on the part of the researcher.

iii) It is said that this approach only helps in consolidating the existing knowledge and does not make any solid contribution to knowledge.

viii. Case Study Approach

Case study approach involves a deeper investigation of a single unit, may be an individual, a family, an institution, a district, a police station, a community or any single event selected for intensive examination. It is an approach, which views any social unit as a whole. It is a way of organizing social data so as to preserve the unitary character of the social object being studied

ix. Explorative Research

The aim of explorative research is not to test or demonstrate or hypothesize. It aims at developing an already established hypothesis. It enables the researcher to become more familiar with the problem or to develop new insights into old theories.

x. Pure Research

Pure research is also known as fundamental research. This is intended to satisfy the researcher's thirst for knowledge. It may be for designing tools of research. It is very often confined to the academic world. It has no concern for the application of findings to actual problems in areas considered to be the concern of people other than the investigator; it forms the basis for the applied research. However, this may provide the basis for policy decisions. For example a study on the impact of literary rates or crime rate in Madurai district is a pure research.

xi. Applied Research

Applied research refers to the applications of science to a singular situation. Its purpose is improving a product or a process testing theoretical concepts in the actual problem situations. For example a study on the impact of TV addiction among school children with reference to their delinquent behavior.

xii. Action Research

It is not focused on the immediate application, not on the development of a theory, nor upon general applications; it has placed its emphasis on a problem here and now in a social setting. Its findings are to be evaluated in terms of local applicability, not in terms of universal validity. In short, a study of this type is very much localized. For example A study on the causes of frequent riots in Palayamkottai Central Prison.

In this Unit the main approaches used by researchers in the fields of social sciences are discussed. Each of the approaches discussed has its own limitations. However, the advantages outweigh the limitations. Therefore, the researchers make use of these

approaches extensively. The choice of a particular approach depends upon the nature of the problem and the research objectives.

1.10 Summary

Research methodology is a subject that familiarizes the students to the basic logic and research procedures and expectations. The development of any science depends on the use of improved research techniques in that field. A discipline is considered to be more scientific if it has developed intensive research methods. Social research examines the growth and decay of changes and their effects in the society that human beings undergo while engaged in social life. The aim of social research is to study the nature of the society. This study is theory based and meant for understanding the nature of the society. A researcher's primary goal - distant or immediate - is to explore and gain an understanding of human behavior and social life, in order to extend, correct, or verify knowledge and to know whether that knowledge aids in the construction of a theory or in the practice of an art" – Hypothesis is a tentative generalization that a researcher assumes at the beginning of taking up a research problem. This tentative generalization when proved at the end of the research becomes a theory. Scientific research has features such as to explore facts, find out immediate solutions to problems mainly at methodological levels and organize facts and critically appraise the existing concepts.

Research as a scientific process comprises a definite sequence of procedure involving five major steps viz.

(i) formulation of the problem (ii) description of the design of studies; (iii) presenting the methodology rationale; (iv) analyzing the data and presenting the results; and (v) interpreting the results and drawing conclusions. These five stages are followed in any scientific enquiry. Thus, it can be said that research is a planned activity involving a systematic process having for it a definite goal to reach. In its attempt to solve the problem neither objectivity is sacrificed nor the scientific temper is lost in the process. Science is always based rationality and practicality. Science is divided into natural and physical sciences.

Also they are divided into pure research and action research. Further it is divided into positive and normative research.

In the process of scientific development, one may identify four successive stages. They are as follows. The Classificatory Order, The Causal Order, Mathematical Order, The Order of Theories. The scientific procedure has tools, techniques and methods to be followed during investigations. Scientific method has three important steps namely, observations, hypothesis and verification. According to the nature and objective of the science, scientific methods may adopt either of the two following methods viz., deductive and inductive methods. One is technical method and the second one is logical method.

Features of scientific method of inquiry has the following features viz., reliance on empirical evidence, use of relevant concepts commitment to objectivity, ethical neutrality, predictions based on probability generality and public methodology. There are different types of research approaches viz., Inter - Disciplinary Approach, Evolutionary or Genetic Method, Historical Method, Descriptive Method and Experimental Research. The experiment conducted by the researcher should have both internal and external validity. In addition to these there are Case Study Approach, Pure Research and Applied Research methods.

In this Unit the main approaches used by researchers in the fields of social sciences are discussed. Each of the approaches discussed has its own limitations. However, the advantages outweigh the limitations. Therefore, the researchers make use of these approaches extensively. The choice of a particular approach depends upon the nature of the problem and the research objectives.

1.11 Key Words

Scientific Attitude	The tendency of human beings in accepting the scientific basis of life of cause and effect.

Internal Validity	To the extent, the observed occurrences are not influenced by extraneous factors, is a measures of the internal validity of the experiment.
External Validity	To the extent, the systematic relationship that have been identified, isolated and measured they can be generally used to predict relationship outside the experimental setting. This is a measure of the external validity of the experiment.
Action Research	This method is used to find a solution to a practical current problem.

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1.13 Answers to Check Your Progress

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3.	1.6
4.	1.7
5.	1.9

1.14 Model Questions

1. What are the objectives of research?
2. Explain the approaches to research?
3. Describe the types of scientific research.
4. Discuss the process of experimental research.
5. Explain the methodology of social science research.

Unit- 2

Criminological Research and Formulation of the Research Design

Introduction

Before the researcher enters the field of research for an empirical survey< he has to plan his work threadbare from beginning to the final submission of the research report. This **task** is called formulating a research design by the researchers. The aim of formulating a research design is to enable the researcher to perform his work with a greater amount of clarity and certainty. He is able to **visualize** what will be the outcome of performing a particular research activity. In this Unit how a perfect research design can be formulated in the field of criminology is discussed.

Objectives

The following salient features of research design are discussed in this Unit.

Research Design Structure- Meaning And Functions

The criteria for a Good Research Design

Important Points in the Functioning of a Research Design

Experimental and Non-Experimental Research Designs

Different stages in formulating a Research Design and

Unit Structure

Introduction

Objectives

2.12 Book References

2.13 Answers to Check Your Progress

2.14 Model Questions

2.1 The State of Present Criminological Research in India

Criminological research is primarily committed to the establishment of systematic and valid knowledge about crimes and criminals. This involves empirical investigations and techniques to explore the magnitudes and the causes of crimes, their impact and their remedies. This implies that those who commit crimes come under the purview of criminological research. Increasing crime rates both conventional and non-conventional warrant application of research in the problem. The following are the stages in criminological research.

1. **Research Design**

To start with, the problem to be studied must be specified, concepts defined hypothesis derived and population defined.

2. Sampling

The criminological researcher must decide the sampling design, types and their application.

3. Construction of Questionnaire

The researcher in criminology should frame an ap propriate questionnaire for his/her study.

4. Data Collection

The researcher needs two kinds of data, namely, primary data, which are to be collected from the questionnaire framed for the purpose and secondary data which may be collected from relevant secondary sources of information like journals, periodicals, text books, research reports, government reports etc.

5. Data Classification

The primary and secondary data thus collected must be classified and coded to suit the objectives of the researcher.

6. Data Analysis and Interpretation: Finally, the researcher must analyze the data and search for the causal connections between the

Check Your Progress

1. State the characteristics of a research design

variables selected. Such an analysis must correlate with the hypothesis of the study. This must be followed by data interpretations which should facilitate the writing of the report.

2.2 Criminology an Allied Science

A researcher in criminology may have to encounter unique problems because; this is a highly sensitive field of study. This involves a combined study of the environment, biological, socio - cultural, psychological, political and economic factors. The researcher however, has the advantages of tools of social research which could be liberally applied to research in criminology.

Criminology research covers a very wide horizon which includes, not only the spheres mentioned in the previous para, but also the various dimensions of the police different branches of forecast science and forensic medicine, ballistics, and criminology The ultimate aim is to find solutions to various types of crimes. With increasing crimes and criminality in the society, research in criminology is also advancing. There are research organizations at the institutional levels and government levels in many countries to foster research in criminology. In India, many universities are offering research oriented a course of study in criminology. with a research approach. At the national level the Bureau of Police Research and Development, the National Institute of Criminology and Forensic Science are providing the necessary guidance, support and funds to those who are interested in pursuing criminological research.

2.3 Research Design

Research design refers to the perfect planning of even the minute aspects of the research procedure. Selltiz and others define research design as the arrangement of the conditions for collection and analysis of data in a manner that aims to continue relevance to the research purpose with economy in procedure. Research design indicates the entire process of planning and carrying out a research study prior to the actual field work so that the researcher would go ahead / proceed with his investigation regarding clear ideas of selling and other steps concerning the research work. It is like making out a

blue print or plan for the construction of a building so that one could have control over the situations.

A poor research design may produce insignificant and erroneous conclusions. So special care must be taken while developing the research design. The relative merits and demerits of each design, in the social sciences are already discussed in the first Unit. Each type of research requires a particular type of design. Type of research is based on the purpose of research and the nature of the problem chosen for research. Therefore, the research design also depends upon the nature and dimensions of the research problem and purpose and requirements of the whole process of research.

A good research design should fulfill four conditions as given below.

i. Objectivity

The design is considered fairly objective if every researcher using it arrives at precisely the same result. The objectivity of agreement between the final scores of the procedure may be judged by the degree assigned to different individuals by more than one dependent observer. In the case of more 'subjective' measurements, the final evaluations and report of different observers will not agree with each other.

ii. Reliability

Reliability means 'consistency' throughout the series of measurements. If a respondent gives out a response to a particular item, he is expected to give the same responses to that item whenever he is asked subsequently. The investigator should frame his questions in such a way that the respondent could give only the genuine response. If the respondents keep changing the responses to the same question when asked repeatedly, it would mean that the 'reliability' of the design is less.

iii. Validity

The measurement scale should measure what is intended to measure. For instance, an attitude scale intended to measure the attitude of respondents towards corruption, should measure only, his attitude towards corruption and not anything else.

iv. Generalization

Generalization refers to how best the data collected from a sample can be utilized for drawing generalization which may be applicable to a larger group. The conclusion of the study conducted on a small sample should be good enough to be applicable to a larger population. A research design helps the investigator in his attempt to generalize, provided he has taken proper care in the choice of the population, selection of the samples, application of a proper tool and use of appropriate statistical analysis.

2.4 Important Concepts Relating To Research

i. Experiment

The process of examining the truth of statistical hypothesis reflecting some research problem is known as an experiment. Experiments can be of two types, viz., absolute experiment and comparative experiment. For example, if one wants to determine the impact of fertilizer on a particular crop it is known as absolute experiment. If you accept to determine the impact of one fertilizer as compared to some other fertilizes, the experiment is called comparative experiment.

ii. Experimental and Non - Experimental Hypothesis

When the purpose of research is termed as hypothesis testing, it can be experimental research design in which an independent variable is manipulated in terms of experimental hypothesis testing research. A research wherein an independent variable is not manipulated is called non-experimental hypothesis testing research.

iii. Treatments

Different conditions under which experimental groups are usually put are referred to as treatment. For example, studying the impact of three programs of correctional measures such as education, vocational training, meditation and yoga on the inmates of a central jail may be called treatment.

iv. Control

A good research design must minimize the influence of the effect of extraneous variables. This is called control. In experimental research, the term control is very essential.

v. Confounded Relationship

When the dependent variable is not free from influence of external variables the relationship between dependent and extraneous variable is said to be confounded.

vi. Experimental Unit

The pre-determined plots are the blocks where different treatments are used. They are known as experimental units. The different concepts relating to designs are discussed here, for better and easy understanding of the various types of research design.

vii. Dependent and Independent Variables

A concept, which can take different quantitative values is called a variable. For example, the concept, like weight, height, are examples of variables because they take different values for different people. But, all variables are not continuous; Continuous variables are called discrete variables. For example age is a continuous variable, but the number of juvenile offenders is a non - continuous variable. If one variable depends upon or is a consequence of the other variable, it is termed as dependent variable of the variable that is attendant to the dependent variable and is termed as independent variable. For example, if demand depends upon price, demand is a dependent variable and price is an independent variable. Also, demand depends upon the price of substitute goods and the price of complement goods etc. Then also demand is a dependent variable and the substitute goods and complementary goods are independent variables.

Check Your Progress

2. Describe the dependent and independent variables

viii. Extraneous variables

Independent variables, which are not related to the purposes of the study, but may affect the dependent variable are termed as extraneous variables. In a child's education there's a certain relationship between achievement in studies of the child and the nutrient food she is provided with. But, even with less nutrient food

with determination of hard work, the child can achieve great successes in studies. This means, nutrient food is not the only factor for the child's intelligence.

2.5 Different Types of Research Design

There are various types of designs depending on the research purposes. The purpose of research may be differentiated into broad groups depending upon the nature of the problem. They are as follows.

1. When the research aims to portray accurately the characteristics of an individual or a phenomenon or an event, the design must be planned accordingly, to fulfill the requirement. This design is known as descriptive or exploratory design.
2. In certain other types of research, the investigator wants to gain more familiarity with the phenomena and achieve new insights into it. Hypotheses may be formulated, in this connection. This type of design is referred to as exploratory or formularized design.
3. Experimental Design is the one in which the researcher tests hypotheses of a causal relationship between variables.

The different varieties of designs can be brought under two broad categories viz. experimental designs and non- experimental designs. Let us discuss them below. Non-experimental design is of two types namely; exploratory or formulative design.

i. Experimental Design

A design programmed for conducting the experimental research is called experimental design. Different types of experiments can be conducted depending upon what we want to know. Hence, there are different types of experimental designs to be explained. Experimental designs refer to plans outlined for experimental research.

The most important types of experimental designs are discussed below. In experimental design, the researcher decides that a particular occurrence (X) will determine the occurrence of another event. That is X is the cause of Y. It is also possible that whenever 'X' occurs there is the likelihood of 'Y' to occur. This is called concomitant. There is also the time factor to take note of, that is 'Y' follows 'X' - not - 'X' follow s 'Y' in which 'X' can not be the cause of 'Y because of time lag. In the

physical world, the direct causation is possible like - the boy hitting the bottle with a rod and the bottle breaking. Here the hitting with a rod is the cause for the breakage of the bottle but in social events contributory or partial causation is recognized. The cause of an event may be indirect and probable. Causal relationship between two variables in social sciences like criminology is established with the help of experimental designs.

Experiments are studies in which the researcher has control over independent variable and over the assignment of subjects to different conditions. In experiments we identify two different variables. One is dependent variable in which the changes are results of the influence of the independent variable or variables. The independent variable is the one that is manipulated or treated in a study to see what effect it will have on those variables proposed as being dependent on it. For example sex is an independent variable and education is a dependent variable. The ideal experiment is conducted in a laboratory in which the effects of the independent variables are assessed while other possible effects are ruled out. However, experiments cannot be conducted in 'real life' situation if the researcher has not enough control over' the environment.

To conduct an experiment, we should have two groups-a control group and an experimental group. The control group provides essential protection against the possibility of trial factors other than experimental treatments which have influenced the dependent variable. These two groups could be formed with subjects either by (a) randomization or (b) matching. Randomization involves random assignment of subjects to these two groups. The assignment procedure might give each subject the same change of being assigned to any one of the two groups. This could be done just by flipping, a coin giving random number. In the case of matching, certain background factors of the subjects with the same qualities and feature are taken into account. Care is taken to match them perfectly.

There are numerous types of experimental designs to suit the nature of the study. The two most significant and basic forms are after only design and before - after design.

a. After Only Design

Individual subjects are randomized to make two groups. These two groups are not measured with respect to the dependent variable before exposure to the experimental variable. The experimental group is exposed to the experimental variable. The control group is not. Both the groups are measured after the experimental variable is introduced on the experimental group. The variation found / not found on the experimental group will determine the relationship between the two variables, (either as positive or negative).

b. ii. Before After design

Randomization is done as explained above. In this design, both the control and the experimental groups are measured before the exposure of the experimental group to the experimental variable. Then the variable is introduced. The measurement is done after both the groups alter the introduction of the variable. This ensures the reliability of the experiment.

Experimental design covers a few more types of experiments that are more elaborate and aim to determine the cause effect relationship more specifically and precisely.

v. Basic Outline of Experiment

In experimental design two groups are selected that do not differ from each other significantly. The 'experimental group' is not exposed to it. After the experiment is over, these two groups are compared in terms of the assumed effect. Three types of evidence are required for testing casual hypothesis.

a) The first type is known as concomitant variation. The investigator could determine whether the assumed effect occurs more frequently among those who have not. been exposed to it.

b) The second one is that 'Y' does not occur before 'X' occurs. We are choosing two groups and apply a variable to ascertain its effect on one group. This being the case, the difference in these two groups after

exposure of one of them to 'X'. 'Y' can be said to have decisively followed 'X'.

c) Evidence of third type is concerned with ruling out other factors as the possible determining conditions of 'y' which may be secured in several ways in an experiment. Such possible conditions are; a) eliminating factors that have occurred in the past, b) avoiding contemporaneous events other than the exposure to the experimental variable c) maturational or development changes in the subjects of the experiment and d) the influence of the measurement process itself. Different procedures have been evolved to eliminate each of the above type of factors as possible determining factors of 'Y'. One such measure is to select the two groups significantly matching with each other.

d. Randomization

The members of the control and experimental groups are assigned at random so that each subject is given changes of being assigned to the group. The choosing may be done either by flipping of a coin for' head or' tail' procedure. This does not mean that these two groups will be exactly alike but that whatever differences do exist between them prior to exposure to the experimental variable, may be due to change.

e. Matching

Matching of members to each group (control and experimental group) is done by balancing of each member with a counterpart to another group. That is certain factors like age, sex, intelligence, education etc., are perfectly matched with members of each group. Matching increases the sensitivity of the experiment. But matching of groups is a difficult work because of the following reasons: a) if matching has to be done perfectly, than a large number of cases are to be selected in order to get adequate pair. There may be cases for which no matching is possible, b) it is difficult to know which factors are more significant to be matched c) There are few factors like attitude for which no matching can be perfectly made.

Check Your Progress

3. What is matching?

There are four varieties of research design as follows:

Before After: Single Group, With One Control Group, With Two Control Groups and With Three Control Groups.

In after-only experiment, the measurement is not done before the procedure starts. It has been assumed that both the groups are the same in all qualities. Once the experiment is over, we do not know whether the difference is either due to initial or due to the exposure. Hence, in the before-after experiment the groups are measured both before and after the experiment.

This design has certain advantages

a) They increase the sensitivity of the experiment

b) They make it possible to determine the incidence of change in the dependent variable and to consider it in evaluating the result.

c) In case the issue under study has a hypothesis specifying the initial on the dependent variable, then measurement is essential to the hypothesis.

d) It increases the confidence that a difference found on after measurement is definitely due to the effect of experimental variables.

Before and After Experiment with a Single Group

Condition	Experimental Group
Before Measurement	Yes (Y_2)
Exposure to Experimental factor	Yes;
Exposure to uncontrolled Events	Yes
After Measurement	Yes (Y_2)

Before and After Study with One Control Group

Condition	Experimental Group	Experimental Group
Before Measurement	Yes (Y_1)	Yes (Y_2)
Exposure to Experiment Variable	Yes	No
Exposure to uncontrolled Events	Yes	Yes
After Measurement	Yes (Y_1)	Yes (Y_2)

Along with these three research design there exists another type of research design. It is known as determination research design. This method helps in providing guidelines to the solution of a problem. This type is considered superior to other designs in solving problems. This type tries to find out the causes for the origination of a problem and arrives at an ultimate solution. This kind of research design is helpful in solving medical problems and social problems.

We have so far seen that a social researcher has four types of research designs to select a suitable one for his research. He can choose the best type of research design which will yield good results to the solution of his problem.

ii. Descriptive Design

Many social researchers have been concerned with describing the characteristic features of communities for explaining an event or phenomena. This sort of studies describe the factors relating to the issues - like, social backgrounds, educational status and health status or enumerate different stages of an event. For example, a researcher may take the study of a particular tribal community. Here, he will collect and present with care an elaborate description of the existing

conditions, structure, customs and practices. There may be studies to explain the structure and functions of organizations that can be grouped under descriptive design. Certain other social researchers may have the objective of describing marriages or funeral practices of a community as a sociologically concern. These types of research questions presuppose much prior knowledge of the problem to be investigated. The methodology involved in this design is mostly qualitative in nature producing descriptive study must be carefully planned because the very aim of the research is to obtain accurate and complete information. Although this design can be formulated before starting the research work, the researcher should take every measure to avoid bias. He has to take into account the amount of work and the expenditure involved.

iii. Exploratory Or Formulative Design

In the case of exploratory studies, unlike the descriptive design the researcher has minimum knowledge about the issue at hand and wants to explore the issue or situation in order to get more familiarity and information on it. Exploratory designs have the aim of formulating a problem for more precise investigation. Exploratory studies help in developing hypothesis and also to clarify concepts. Sociological theories are often too specific or too general and for young social scientist there is room for exploration of social events or issues with the backgrounds of these theories and their concepts. For example, the theories of suicide or conflict could be used for further exploration in a different social event. For instance, the investigator in this research has to find out various causes responsible for it and also the most important variables.

This type of exploratory research has to adopt certain procedure, so that the work could be carried out without obstacles. They are discussed below.

2.6 Review of Related Literature

Having formulated the research topic, the investigator must review work done on related topics by others. This will help him build upon his work more firmly and also to economize his efforts in the

inquiry. He has to search for relevant material in journals, books and abstracts. Some of the source of information is book publishers, bulletins and journals, documentations in public administrations, Indian agriculture index, Indian education indexes ICSSR Research Abstracts Quarterly, Indian Behavioral Science Abstract and government publications. In the case of criminological research, the researcher can have access to lot of literature in the relevant website.

i. Experience Survey

Review of literature gives only the basic knowledge on the issue. It is the beginning of formulating research. Written work is a small portion of the existing knowledge. But, the everyday experiences of many people are helpful to observe effects of alternative decisions and actions with respect to problems of human relations. Such reservoir of experience could be of tremendous value in helping social scientists to be aware of the important influences operating in any situation that may be called upon to study. They are also rich sources of information. For example, in the study of female infanticide, the local people, the women who perform the killing and also the mother who is involved in it can also supply plenty of information on the issue. The basic objectives of such experience survey are to gather and synthesis such experiences in the research work.

ii. Analysis of "Insight Stimulating" Cases

Other than the experience survey, the investigator should select a few important 'cases' which would supply him with enormous amount of information, experienced and stimulated insights, Sigmund Freud's insights to the psychological problems were stimulated by intensive study of his cases. Exploratory design is used to gain insight or to frame hypothesis. It involves the steps explained above. Although, no simple rules can be established for the selection of the instances to be studied, the experience indicates that for particular problems certain types are more appropriate than others

Check Your Progress

4. Describe Experience Survey

2.7 Steps in the Preparation of Research Design

The following are the important components of research design, They are not mutually exclusive but interdependent in nature.

i. Source of Information to be Tapped

The sources of information to be tapped depend upon the type of study. There are three major sources, namely, documentary sources of both official and unofficial nature, personal sources and library sources. The documentary sources of information forms reports, statistics, manuscripts and letters, etc. These sources may be either primary or secondary. The primary sources are those from which collections are made first hand. Data from primary sources may be collected by participant observation, personal interview, correspondence, questionnaire etc.

ii. Nature Of Study

The research design depends upon the nature of the study whether it is statistical study or a case study or a comparative study or experimental study or a combination of all of them.

iii. Objectives Of The Study

The objectives of the research study are derived from the major aim of the study. One can draw 3 or 4 objectives from the major aim. The objectives shall cover all the dimensions of the subject of study.

iv. Geographical Area To Be Covered

The physical boundaries of the area have to be specified in the research design. It may be called the area of study.

v. Socio-cultural context of study

If the studies are related to the human beings, it is necessary to ascertain the socio-cultural behavior pattern of the people.

vi. Period of Time to be Covered

It is necessary to ascertain the time dimensions of the study or the period of time to be encompassed, so that exploration of the problem will be easier and clear. It may be called the period of study.

vii. Dimensions Of The Study

It is essential to make clear about the number of cases to be studied. The limitations of the proposed investigations should also be clearly mentioned in the research design.

viii. Bases for Selecting the Data

Depending upon the time and cost factors, the basis for selecting the data have to be decided. It is more economical and efficient to base studies on samples rather than universal study. But the sample should be the representative of the universe. The size of sample does not necessarily reflect the representative characteristics of the universe studied.

ix. Techniques of Study

A suitable technique for collecting the necessary data is to be determined. The techniques adopted may be observation, schedule, interview, questionnaire or the combination of them. The choice of the technique depends upon the accuracy of data required, size of sample, geographical area to be covered etc.

The researcher may select any one of the research designs for his study. The selection depends upon the purpose of the study.

The consideration which enter into the decisions regarding what, where, when, how much, by what means; constitute a plan of study or a research-design. However, a research design has to be geared to the available time, energy and money. There must be some room for modifying or changing the research design when the study is in progress.

2.8 Advantages of Research Design

The preparation of research design has the following advantages.

1. It saves researchers time, energy and money.
2. It helps to prepare and execute the various activities systematically.
3. It helps for the better documentation of the research activities
4. It ensures a proper time schedule for the project.
5. It provides confidence and hope for the researcher to complete the work.
6. It provides satisfaction and sense of success at the completion of every stage of the work.

Check Your Progress

5. What are advantages of a research design?

2.9 Formulation of the Problem

Formulation of the problem is an important aspect of the research proposal. If the problem is not carefully and scientifically

stated, it will lead to confusion about the interest of the researcher. Use of clear, simple and concise statement is preferable. The major statement may be followed by minor statements. The problem can be stated either in question form or as a declarative statement as follows:

(i) To know the level of literacy of property offenders.

(ii) Is there any significant association between the L & O awareness and crime rate?

(iii) Impact of broken Family on Juvenile Delinquents.

In the preceding three statements, the first is in declarative statement and the second is in question form; while, the third is in the form of causative statement,

i. Scope of the Study

The title of the study should give an idea about the nature of the problem studied. But the scope of the study refers to the various dimensions of the study that is to be analysed. The scope depends upon four factors namely, (i) the availability of data, (ii) availability of funds, (iii) availability of time and (iv) the co-operation of the respondents. Research problem should find a place in the scope of the study.

ii. Justification for the Problem Studied

This refers to know how the study will influence theory and practice. If the findings of he study helps to build scientific theories or help to practically solve problems, we can say hat the study is significant. A study will have significance if it can fill up gaps in research ind provide solution to the problem. The researcher in criminology should also have grounds of justification for selecting the particular problem, such as juvenile offenders, female infanticide etc.

iii. Review o Literature or Survey of Literature

One of the easiest ways of economizing effort in an inquiry is to review and build on the work already done by others. It is essential to review all the relevant materials connected with the problem chosen so as to show how the problem under study relates to previous research studies. It is also equally important to show how this work differs with isting literature. In an exploratory study, the focus of review may be on

hypotheses that ay serve as leads for further investigation. Hypotheses may have been explicitly stated by previous investigator and in the light of their usefulness/it is necessary to consider whether they suggest new hypotheses in those cases. Where hypotheses have not been formulated, the task is to review the available material with sensitivity to the hypotheses that may be derived from it. The sensitive descriptions to be found in the works of creative writers are also a fertile ground of hypotheses or study. As review of literature in the written form is of small proportion, a reservoir of data can be gathered from experience survey as well. In certain unformulated areas if there is lack of experience to be taken as a guide, few selected samples can be intensely studied. They will provide stimulating insights into a problem.

iv. Principle of Narrowing Down

Once the researcher fixed his / her main area of research, the next step is to . narrow it down to a specific and particular issue or a problem. This is called narrowing down. Once the specific problem or issue is identified in a broad field of study, the next move is to make an in depth analysis of the issue in terms of cause, extent effects and remedies of the issue with an indication of policy implication.

A larger issue like property crimes, may be narrowed down to a particular period, particular place, particular time and particular M.O. or particular type of victims. It may be pointed out that every larger issue or a problem can be reduced or narrowed down to a specific issue and every series of small issue can be blown into a larger study.

v. Data Availability

Selection of a problem or issue is also governed by data availability, that is, both primary data and secondary data and also the degree of their complimentarity. With regard to primary data, the study must be suitable for some type of sampling; and regarding secondary data, the researcher must have access to published data and reports of the concerned organization. If such data are not available, then the study may get struck up somewhere.

2.10 Summary

Seliltz and others define research design as the arrangement of the conditions for collection and analysis of data in a manner that aims to continue relevance to the research purpose with economy in procedure. A good research design should fulfill

ii.Validity and iv. Generalization. There are different types of research designs. There are different varieties of designs. They can be brought under two broad categories viz. experimental designs and non-experimental designs. Non-experimental design is of two types namely; exploratory or formulative design, descriptive design and others. The following are the important components of research design, They are not mutually exclusive but interdependent in nature. They are i. source of information to be tapped, ii. nature of study, iii. objectives of the study, iv. geographical area to be covered, vi. period of time to be covered, vii. dimensions of the study, viii. bases for selecting the data, and ix. techniques of study. Before embarking on a research project the following factors should be determined .They are (i) the availability of data, (ii) availability of funds, (iii) availability of time and (iv) the co-operation of the respondents. Research problem should find a place in the scope of the study.

2.11 Key Words

Objectivity	Purpose of the research project
Generalization	Generalization refers to how best the data collected from a sample can be utilized for drawing generalization which may be applicable to a larger group.
Experimental Unit	The pre-determined plots are the blocks where different treatments are used. They are known as experimental units.
Control	A good research design must minimize the influence of the effect

	of extraneous variables. This is called control
Extraneous Variables	Independent variables, which are not related to the purposes of the study, but may affect the dependent variable are termed as extraneous variables.

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2.13 Answers to Check Your Progress

Question No.	Section
1	2.2
2	2.3
3	2.5
4	2.6
5	2.9

2.14 Model Questions

1. State the procedure in formulating a good research design.
2. Explain the method to establish an experimental research design.
3. Review a good and detailed research design procedure.
4. What are difficulties in choosing a group suitable for experimental design.
5. State the advantages of a good research design.

Lesson-3

Hypothesis

Introduction

Hypothesis is usually considered as the principal instrument in research. Its main function is to suggest new experiments and observations. In social sciences where direct knowledge of population parameter is rare, hypothesis testing is often used as a strategy for deciding whether a sample data differs or support for a hypothesis, such that generalization can be made. Thus hypothesis testing enables us to make probability statements about population parameter. The hypothesis may not be proved absolutely but in practice it is accepted if it has withstood critical testing. In this Unit the various aspects of hypothesis are discussed.

Objectives

The Salient features of hypothesis concept are discussed here.
Definition and Meaning of Hypothesis
Various types of Hypothesis
The Source of Hypothesis
Experimental Method to test whether hypothesis
acceptable and
Advantages, disadvantages and errors of hypothesis

Unit Structure
Introduction

Objectives

3.1 Definitions and Meaning
3.2 Formulation of Hypothesis
3.3 Different Types of Hypothesis
3.4 Characteristics of Hypothesis
3.5 Sources of Hypothesis
3.6 Choice of Variables for formulating Hypothesis
3.7 Difficulties in Proving the Research Designs
3.8 Procedures for Testing Hypothesis
3.9 Criteria for Evaluating Hypothesis
3.10 Errors in Hypothesis

3.1 Definitions and Meaning

Webster's Dictionary gives the definition of hypothesis as a proposition, or condition or principle which is assumed perhaps, without belief, in order to draw out its logical consequences and by this method to test its accord with facts which are known or may be determined. According, to Goode and Hatt, a hypothesis is a proposition which can be put to a test to determine its validity. It may prove to be correct or incorrect. However, it leads to an empirical test. Every research should proceed from a hypothesis. Research investigations carried on without a hypothesis will lead the investigator nowhere. It will be relatively an aimless research and the data collected may be vague and irrelevant. Hypothesis gives guidance and direction to research and enables the researcher to focus his attention directly on the problem concerned. It also helps him to go ahead in his work without errors and collect required data without waste of time and resources.

3.2 Formulation of Hypothesis

Hypothesis is formulated when a social issue is required to be investigated. A tentative generalization is formulated. Data relating to the generalizations are gathered eliminating the unnecessary information and, an analysis is made an finally the hypothesis is proved or disproved. Therefore, to formulate a hypothesis, there should be a problem for which enquiry is needed. There is no definite set of rules laid down to formulate a hypothesis. Sometimes, hypothesis could be formed just on the basis of ideas of people. But a sound hypothesis springs from knowledge previously accumulated on an issue. It contains the essential elements and their connections between

a set of facts. Scientific procedures play a vital role in the formulation of a good hypothesis. It should be based on facts and theories already existing on the issue to be explored. The hypothesis is the necessary link between theory and the investigation, which leads to the discovery of additions of knowledge.

Formulation of a hypothesis, whether based on facts, theories or simply common knowledge, is not an easy task. There are a number of difficulties in the process of formulating an useful hypothesis. According to Goode and Hatt, there are three chief difficulties. Firstly, is the absence of a clear theoretical framework. Secondly, lack of ability to utilize the theoretical framework logically. Thirdly, the failure to get familiarized with available research techniques so as to phrase the hypothesis properly. With sound theoretical backgrounds a definite and a testable hypothesis could be formulated.

3.3 Types Of Hypothesis

Hypotheses may be classified broadly into two types. They are, crude hypotheses and refined hypotheses. Crude hypotheses are of low-level abstractions. They are mostly used to repeat to previous piece of scientific work. They simply duplicate the already existing work and not to extend beyond checking the findings. They do not lead to a higher theoretical research. In the use of refined hypothesis, three broader levels may be distinguished.

i. Refined Hypothesis

1. Many of the sociological knowledge are common sense observations. Such common - sense observations and questions are formulated as hypotheses. They represent the scientific examination of common sense propositions. This is a type in which facts are added up to the existing knowledge without testing up of hypotheses. This type of studies yields results expressing the degree of uniformity of social behavior. Examples for research with this type of hypotheses are studies on behavior of students in colleges, practices of certain communities, family structure and function etc. Although hypotheses of this type (commonsense observation) are criticized as not useful ones, two points are to be considered. That is, what everyone knows

should be put to precise and definite statement rather than as a vague guess. Secondly, what everyone knows may be incorrect. And hence, such hypotheses are also to be studied. For instance, love marriages are opposed by parents' is a 'common-sense' hypotheses which is to be tested as to (a) whether a majority share this view and (b) also to find out whether it is a correct statement.

2. There are some hypotheses that are related to complex ideal type. This type of hypotheses goes beyond explaining just the empirical uniformity. They create more scope for other conditions, deviations and distortions. This type aims at testing the existence of logically derived relationships between empirical uniformities. The function of such hypotheses is to create tools and concepts for further research. These concepts are taken up to formulate hypothesis and studies.

3. Hypothesis may also be concerned with the relation of analytical variables. This is more abstract level hypothesis. The type of hypotheses is concerned with analytical variables and the relationship between them. Research with such hypotheses try to find out how changes in one variable, create changes in other aspects. For instance, the crop production and its relationship with rainfall, fertility' of the soil, maturing and other variables could be studied. This type of studies try to bring out the cause and effect relationship and the degree of relationship. In order to formulate hypotheses of this type, a good theoretical background is required.

Based on these criteria there are essentially four type of hypothesis: They are;

1) Correlative Hypothesis;
2) Null Hypothesis;
3) Directional Hypothesis; and
4) Causal Hypothesis.

Let us discuss them one by one.

ii. Correlative Hypothesis

Correlative hypothesis is a statement of relationship betweer two (or among more) concepts. However, the nature of the relationshir

will not be specified in this statement. The following two statements are examples of correlative hypothesis.

i) There is a relationship between age and crimes.

ii) There is a relationship between cultural background and certain types of crimes.

In each of the above statements the relationship between two variables or concepts are indicated. But the nature of the relationship is not made known. That is, the hypotheses do not tell us whether it is old or the young who are thought to be more criminal nor whether certain crimes are thought to be more or less likely when a certain cultural background is present.

iii. Null Hypotheses

A null hypothesis is negative in character and is more exact and useful because it does not encourage bias. It is easier to disprove the contrary of hypothesis than to prove it. A hypothesis which is stated negatively is called null hypothesis. A null hypothesis is used to collect additional support for the known hypothesis. Since the data is collected regarding the hypothetical statement, the null hypothesis reduces personal bias. Null hypothesis asserts that there is no difference between two populations with respect to some property.

If the difference between the two groups is too great to be attributed to sampling error, the null hypothesis is rejected. If the difference between the two groups is not too great, then the null hypothesis is accepted. The apparent differences are not due to chance or sampling error.

The rejection or acceptance of null hypothesis is based on some levels of significance as a criterion. It may be either 5% (0.05) or 1% (0.01) level of significance. Rejecting a null hypothesis at the 0.05 level significance indicates that the differences it means (averages) would not likely to have resulted from sampling error In more than out of 100 replications of the experiment. This suggests that 95 percent probability that the difference was real rather than sampling error.

iv. Directional Hypothesis

With the directional hypothesis, the researcher makes a guess about the direction of the relationship between concepts. If the researcher thinks that concepts are apt to increase in size together or decrease in size together, then there is a direct relationship, hypothesized between them. Functionally this may be stated, when X increase Y also increases. For example, see the following hypothesis.

i) As a person's years of formal education increases, the person's income increases.

ii) As the percentage of a country's literate population increases, the country's political process becomes more democratic.

iii) The less newspaper reading a person does, the less informed about current events the person will be.

If on the other hand, the researcher thinks that as one concept increases in size or amount another one will decrease in size or amount and then an inverse relationship is suggested. For example see the following hypothesis:

i) The older a person is, the less tolerant of social protest, the person becomes.

ii) The more affluent the country becomes, the less property crime that country will have.

v. Causal Hypothesis

Causal hypothesis may be stated in the following three forms.

i) It may simply be stated that one variable is a cause of another. For example.

"Literacy, affluence and cultural homogeneity cause democratic movements in countries".

ii) It may be stated in "if then" terms as in the following example, "If a candidate to the Lok Saba election spends less than Rs. 10,000 then, he will lose".

ii) A causal hypothesis may be stated negatively as in the following example. Increasing gap between the rich and poor will lead to more property crimes.

Null, correlative and directional hypothesis point out either the absence or the presence of connection between one phenomenon or other. Causal hypotheses, on the other hand, advance this proportion but also make the following two claims. One phenomenon (the cause) precedes the other phenomenon (the effect). The effect was dependent upon or could not have occurred in the absence of the cause.

Deciding whether an observed relationship is causal is one of the most challenging aspects of scientific research. The evaluation of causal hypothesis requires extraordinary research designs and data analysis.

3.4 Characteristics of Hypotheses

A hypothesis guides the researcher to decide about the type of data he would collect and the manner in which the cool collected data should be analyzed. A good hypothesis is based on data and might anticipate drawing on previously unknown data. A right type of hypothesis should posses the following characteristics.

I. Hypothesis Should be an Empirical Statement

The empirical statements are educated guesses about relationships that exist in the rear world and can be evaluated with scientific methods. It is because it proposes explanation for a phenomenon that can be empirically observed. It is therefore, said that hypothesis should be empirical statements.

ii. A Research Hypothesis Should Have Principle of Generality

A hypothesis should explain a general phenomenon rather than one particular occurrence of the phenomenon of hypothesis.

3) A hypothesis should be plausible

There must be some logical reason for thinking that the hypothesis might be confirmed. For example, if a researcher makes the following hypothesis. "People who eat two eggs daily are more democratic in their thinking and action".

iii. This Hypothesis will question His Logic.

To formulate plausible hypothesis, the researcher must make use of the methods of induction and deduction. For this literature review will be very helpful.

iv. **A Hypothesis must be Specific**

It means that the concepts used in a hypothesis should be carefully defined. For example, a hypothesis that suggests "there is a relationship between personality and Political attitudes" is, too ambiguous. There is no clarity in it.

A more specific reformulation of this hypothesis might be, the more self-esteem a person has, the less likely a person is to be an isolationist. In this hypothesis, personality has been defined to mean self-esteem, and political attitude has been defined to mean isolationism. Both are more precise concepts.

v. **A Hypothesis should be a testable one**

There must be some evidence that is obtainable and that will indicate whether the hypothesis will be correct. For example, the hypothesis "God created the universe" cannot be tested because it is difficult to tell what sort of evidence could indicate that God created this universe. Hypothesis for which either confirming or non-confirming evidences are impossible to gather and can not be tested.

vi. **It must be conceptually clear**

There must be generalizations, which must be accepted, and communicable rather than the products of the private world. In order to achieve clarity, the concepts must be defined in terms of particular operations.

vii. Hypotheses should be related to available techniques

viii. Hypotheses should be related to a body of theories.

3.5 Sources of Hypothesis

Hypothesis may be developed from a number of sources. Goode and Hatt have identified four major sources of hypothesis. They are:

i. The general culture in which a science develops, furnishes many of its basic hypotheses. Not only do the major cultural values serve to direct research interests but also folk wisdom serves as another source of hypotheses, Subject to its being tested scientifically.

ii. Hypotheses originate in the science itself,

iii. Analogies are often a source of useful hypotheses:

4) Hypotheses are also the consequence of personal idiosyncratic experience: The individual experience of the scientist contributes to the formulation of hypotheses'.

iv. Folk-wisdom serves as another-source of hypotheses.

v. Sometimes, challenges are posed to old assumptions; change or old value emphasizes new aspects of life and individual importance. In these instances such challenges to common sense observations and deviations become sources of hypotheses.

vi. Previously established knowledge could be sources of hypotheses.

Analogies often become sources of hypotheses. Analogy or similarities between facts of conditions facilitate formulation of hypothesis. We may first start with vague similarities but by a careful enquiry, we may develop an explicit analogy in structure and function. Analogy makes the interpretation of hypotheses easy.

3.6 Choice of Variables for Formulating Hypothesis

Hypotheses are formulated to proceed with the research in the proper direction and finally to accept or reject the state of merit. High-level hypotheses have the function of stating the relationship between factors, situations, events or variables which is to be empirically tested. Hypotheses could be tested on the basis of the data. This requires control of the observations in order to eliminate, other possible relationships. The basic design of logical proof was formulated by John Stuart Mill, which remains the foundation or experimental procedure.

The first design is called the method of agreement. When two or more cases of a given phenomenon have only one condition in, common, then the researchers may consider that conditions, as the cause (or effect) of that phenomenon.

For Example

a) Low levels of employment -
b) High levels of poverty
c) Higher rate of illiteracy

Leads to increase in crime rate

This may be a set of conditions for particular phenomena at one point. At another condition/ place.

d) higher level of poverty
e) draught condition
f) Lethargic policing

Leads to increase in crime rate

Both the set of conditions result in observation of crime rate. Since poverty seems to prevail in both the conditions, we may conclude that poverty and crime rate have causal relationship. It may be stated that c = f(p);

Where, 'c' is crime rate, T is functional relation, and 'p' is poverty levels. Another example:

a) Bad road conditions -
b) Lack of traffic control -
c) Indiscriminate way of pedestrian crossings -

Lead to road accidents

Lead to road accidents

a) Bad road condition
b) Lack of traffic control

Lead to accidents

3.7 Problems of Proof in These Designs

1. The problem of recognizing and controlling the variable are important in the research. To identify the important elements related to the problem is a great challenge to the investigator. Control is achieved to a certain extent by matching and randomizing the group.
2. Second problem is that the causal relationship may not be clear. A vague and un sustained relationship between variables is a threat to the research.
3. The third problem is the factor of time. In Social Sciences the temporal factor creates confusions for the investigator.
4. The fourth one is that complicated problem is stated in a very simplistic manner. To overcome this difficulty the after-only and before - after experimental designs are developed which gives more proof and solid conclusions to research in social sciences,

3.8 Procedures for Testing Hypothesis

The following sequential steps constitute the testing of hypothesis.

i. Statement of the Problem.

First of all the problem has to be stated in clear terms. It should be quite clear as to, in respect of what the hypothesis is to be rejected or accepted? This is generally reflected by the very title of the research.

ii. Defining the Hypotheses.

Usually, we start with the null hypothesis according to which it is presumed that there is no difference between a parameter and a statistic. If we are to take a decision whether promotional campaign has increased the sales and if we start with the supposition that, the campaign has not increased the sales then this supposition would be termed as null) hypothesis, which in symbolic from is denoted by him. As against null hypothesis, the researcher may as well start with the same alternative hypothesis (symbolically H2) which specifies those values that the researcher believes to hold true and then may test such hypothesis on the basis of sample data.

iii. Selecting the Level Of Significance

The hypothesis is examined on pre-determined level of significance. Generally, either 5% level or 1% level of significance is adopted in practice for the purpose.

3.9 Criteria for Evaluating Hypotheses

i. Plausibility of Explanation

A satisfactory hypothesis should have relevant and logical plausibility about the relationship of variables included in it.

ii. Testability of Explanations

The variables should be defined operationally so that the predicated relations among them can be tested empirically. The variables of the hypothesis should be measurable and quantifiable.

iii. Adequacy of scope

A hypothesis is of greater value if it establishes a generalization that can be applied in many areas or in many fields. The more consequences that a *hypothesis yields,* the greater Is its fruitfulness,

iv. Roots of Existing theories

An useful hypothesis adds something to previously established knowledge qualifying or enlarging -upon existing theories. It must fit into the framework of existing theories and transform them into more perfect explanatory schemes.

v. Suitability for intended purpose

Each effective hypothesis should serve a specific purpose and must be adequate for the purpose it claims to serve.

3.10 Uses of Hypotheses

Firstly, hypothesis provides directions to research. Secondly, with the help of the hypothesis, specific and relevant data could be collected. It prevents the collection of irrelevant data. Thirdly hypothesis explains all the facts connected with the research issue. Fourthly, hypothesis determines the method of verification as well as procedure for enquiry, as it limits the scope of research within a manageable area. Fifthly, it helps in drawing specific inference and finally, hypothesis leads to the discovery of laws. No doubt, that hypothesis enables the investigator to understand the issue with great clarity. But the failure to have a hypothesis is not a sign of unscientific approach. Some scientists are of the opinion that framing of a hypothesis in a research project might create bias on the part of the investigator towards a stand and lead him to lose objectivity.

3.11 Errors in Hypothesis

In hypothesis testing two kinds of errors may occur viz, the type I error and the type II error. Type I error means rejecting the hypothesis when it happens to be true whereas type II error means accepting the hypothesis when it is false. These two errors can also be put in the following tabular form.

	Accepts H_2	Rejects H_2
	Correct Decision	Type I Error
	Type II Error	Correct
	Type II	*Correct*

The probability of Type I error Is determined in advance and often understood as the level of significance of testing the hypothesis, if the significance level is taken as 5% then it means that in 20 cases out of 100 we are rejecting the null hypothesis, which are true. In other words, this means the probability of committing Type I error, 0.05. We can certainly reduce Type I error by varying down the level of significance. With 1 % level of significance, the probability of committing Type I error would be 0.01. But when we try to reduce Type I error, the probability of committing Type II error increases. Both types of errors cannot be reduced simultaneously. Hence, in significance testing one tries to strike an adequate balance between Type I and Type II errors.

i) Computation of The Standard Error

After, determining the level of significance, the Standard Error of the concerning statistic is computed.

ii) Calculation Of The Significance Ratio

The significance ratio symbolically described as Z is often calculated by dividing the difference between a parameter and statistic by the concerned standard error.

iii) Deriving The Inference

The significance ratio is then compared with the pre-determined critical value. If the ratio exceeds the critical value, then the difference is taken as significant but if the ratio is less than the critical value at 5% level, the difference is considered insignificant. For instance the critical value at 5% level of significance is 1.96. If Z exceeds 1.96 then the inference would be that the difference at 5% level is significant and this difference is not the result of sampling fluctuations but the difference is a real one. Similarly, the critical value at 1% level of significance is 2.69.

3.12 Limitations of Test of Hypotheses

The following are the important limitations of tests of hypotheses.

1. Tests should not be used in a mechanical fashion. Testing is not decision making itself. Tests are only useful aids in decision-making.
2. Tests do not explain the reasons as to why does the difference exists,
3. Results of tests are based on probabilities and as such can not be expressed with full certainty.
4. Inferences based on tests of hypotheses cannot be said to be entirety correct evidences concerning the truth of the hypotheses.

All these limitations lead to the conclusion that inferences from the tests of hypothesis should be combined with adequate knowledge of the subject matter along with the ability of good judgment.

3.13 Summary

Hypothesis is a proposition, or condition or principle which is assumed perhaps, without belief, in order to draw out its logical consequences and by this method to test its accord with facts which are known or may be determined. According, to Goode and Hatt, a hypothesis is a proposition which can be put to a test to determine its validity. It may prove to be correct or incorrect. When we attempt to do research on a social problem hypothesis is evolved. There are several types of hypothesis. They are mainly grouped under two main forms. They are crude hypothesis and refined hypothesis. Further, they are divided into correlation hypothesis, null hypothesis, directional hypothesis, cause and effect hypothesis. Hypothesis should be proved when we are completing a research project. Hypothesis should be based on generality. It should be formulated with clarity. The concepts should be clearly defined. It should be applicable to all conditions and testable. The sources of hypothesis are very many. Hypotheses could be tested on the basis of the data. The basic design of logical proof was formulated by John Stuart Mill, which remains the foundation or experimental procedure. The first design is called the method of agreement.

The following sequential steps constitute the testing of hypothesis viz., i. Statement of the Problem, ii. Defining the Hypotheses, and iii. Selecting the Level Of Significance. The criteria for evaluating hypotheses are i. Plausibility of Explanation, ii. Testability of Explanations, iii. Adequacy of scope iv Roots of Existing theories and v. Suitability for intended purpose. The Uses of Hypotheses are very many.

In hypothesis testing two kinds of errors may occur viz, the type I error and the type II error. There are limitations in the hypotheis formulation. Inferences from the test of hypothesis should be linked with adequate knowledge on the subject matter along with the ability of good judgment.

3.14 Key Words

Crude Hypothesis	Low-level abstractions.
Null Hypothesis	It is negative in character and is more exact and useful because it does not encourage bias. It is easier to disprove the contrary of hypothesis than to prove it.
Sources	The bases from which hypotheses may be drawn
Data	Variables Facts that can be used in research
Generality	Generalization A hypothesis that is acceptable to all
Testable Hypothesis	The variables of the hypothesis should be measurable and quantifiable.

3.15 References

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3.16 Answers to Check Your Progress

Question No.	Section No.
1.;	3.1
2.	3.3
3.	3.3.3
4.	3.4
5.	3.9

3.17 Model Questions

1. Explain how an hypothesis is formulated.
2. Describe Directional hypothesis.
3. Describe the methods of testing to ascertain regarding the agreeability of hypothesis.
4. Discuss the errors in the formulation of hypotheses.
5. State the demerits in hypothesis formulation.

Lesson 4

Data Collection

Introduction

A large quantity of information collected through various modes is referred to as data. Different methods are adopted to collect data in criminology depending on the issue under investigation. The two main sources of data in criminological research are paper and people. The material, the researcher collects from libraries records and personal documents are paper sources. They are considered to be secondary data as they are collected from other people's original data and are got second hand by the researcher. The data" collected by the researcher himself through interview and questionnaires are first hand information and hence called 'primary data'. In this Unit and the next Unit, various methods of data collection are discussed.

Objectives

In this chapter the following aspects of data collection are discussed.

Personal and Public Data Sources

Government Documents

Content Analysis and

Questionnaire Method

Unit Structure

4.1 Different Types of Data

i. Documentary Sources

The use of already collected information in research has the advantage of economizing the work. Another advantage is that the data collected over a period on a specific aspect makes possible the 'determination' of trends over time. One more advantage is that collecting information from documents does not require the co-operation of the respondents from whom the information is' gathered'. There is a four-fold classification of documentary sources. They are:

a. Compiled at the time by the writer.

b. Compiled after the event by the writer.

c. Transcribed from primary contemporary sources.

d. Transcribed from primary retrospective sources.

The following are some of the documentary data.

I. Personal Documents

Personal documents are spontaneous first-person description of own experiences, actions and beliefs of a person concerned. For example, personal diaries and autobiographies provide materials relating the social and political background. Sociological analysis such as personal documents are used because psychological concepts and personal attitudes also form a part of sociological enquiry At one

point, the validity of the personal documents was questioned but the use of these documents is indispensable. Two crucial issues have been raised regarding the use of personal documents.

1. The methodological question of how far distortions enter in the course of translating private thoughts into permanent records.

2. The question of how to gather and analyze the number of personal documents needed for the 'derivation of abstract principles or hypotheses'. Self-justification, relief from tension, monetary gain, confession, scientific interest and desire for immortality are some of the motives identified that may induce a person to write about himself. Sometimes, the author may be biased or exaggerate events. But such distortions must be carefully taken note of by researcher and are to be eliminated. However, personal documents by and large contain materials relating to the culture of one's own society. The main forms of personal documents are given below.

(a) Autobiography

Autobiography is the life history of the writer, who displays his own experiences actions and feelings. They are recorded some time after the event had taken place. Since autobiographies are written with the intention of publication, they might suffer from rationalization and affected the style of writing. During the freedom struggle, great leaders like Mahatma Gandhi, Jawaharlal Nehru have written their autobiography while in prison.

Check Your Progress

1, Explain the personal letter as a source of secondary data.

(b) Diaries

Diaries written at the time or soon after the occurrence of an event are an experience of a feeling. Therefore, they have clarity. They are 'intimate journals' and not intended for publishing. But diaries may exaggerate sad and emotional events rather than calm periods in life.

(c) Letters

Letters are also personal documents describing of events of a particular time. Letters give personal impressions of the writer on a situation. They may lack continuity and also assume that the reader might know every detail he is trying to describe.

All these personal documents have both advantages and disadvantages. They will supply very secretive materials on an event and at the same time might also distort the facts by too much personal involvement. The great disadvantage is that no internal test exists to check the reliability of such sources. There are five kinds of circumstances, which may predispose the investigator to believe that the informant is truthful. When the truth of the statement is a matter of indifference to the witness, he is likely to be unbiased.

1. When the statement is not prejudicial to the informant or his interest, he is likely to be unbiased.
2. When the facts at issue are so much the matter of common knowledge that the informant cannot exaggerate it.
3. When the statement is probable.
4. When the informant makes statements that are contrary to the anticipation of the investigator.

Generalizations based on personal documents refer only to the individual persons but not to the whole population.

ii. The Public or Official Documents

a. Public Records and Statistics

Public records and statistics are most reliable sources. Durkheim's Theory on suicide was based on official records on suicides; Records may also be useful to check information gathered for the purpose of investigation. Public records contribute vital statistical information on important events. For instance, the records kept in police stations police headquarters and vital statistics on crimes and criminals. They may not supply the investigator with all explanations for the event but only the figures. It is the responsibility of the researcher to derive at generalizations. The census report and reports of various state departments produce a great deal of useful data.

Documents published by the Indian Government are considered to be a rich data base for all kinds of social researchers and criminologists. Government documents are diverse in their nature and scope. The principal agencies of government publications are the Controller of Publications and Publications Divisions. It is difficult for

the researchers to identify and locate the places where these documents are available. It is due to (a) lack of planning in distribution method (b) limited publicity (c) lack of bibliographies exclusively for government publications and (d) low level knowledge among the heads of the institutions, libraries and researchers.

Government of India documents are Administration Reports, Statistical Reports, Commissions and Committee Reports, Research Reports, Periodicals and Rules and Regulations. Some of the important sources for locating Government Publications are:

1. Government of India publications. A Survey of Their nature Bibliographic Control and Distribution system.
2. Publications of National Crime Records, Bureau, New Delhi.
3. Catalogue of Government of India Publications including Periodicals, 1990.
4. Publications of Bureau of Police Research and Development, New Delhi.
5. The National Institute of Criminology and Forensic Science Publications.
6. Publications of Criminological Research Departments of the Universities and Institutions at the national and world levels.
7. Restricted manuals of the All India Police Science Congress.
8. Reports of the National and State Police Commissions.

There are some advantages of using documents as sources of information. Firstly, data collection does not require the cooperation of the individuals. Secondly, since the statistics is collected and compiled over a period, the trend of change could be assessed. Thirdly bias is not possible. However, the researcher is required to take certain precautions while using the statistics however reliable they may be. They are,

a) The researcher must carefully understand the terms used in documentary sources, because the definitions used in social sciences do not coincide with the definitions given by statistical reports. Materials collected without proper clarification of such terms would lead to confusions and misleading conclusions.

b) It is necessary to enquire into the method of statistical collection of records and its original collector's intention and purpose for which it was collected.

c) Although the errors of government documents will be negligible from the point of view of a social scientist's effort of data collection, it is always wise to check with details given in the statistics. For example, causes of death may be referred to as 'fever' in several cases. While the actual cause may be some other diseases with a symptom of fever.

ii. Biographies

Biographies are written by authors on people who were famous like Jawaharlal Nehru or notorious criminals like the sandal wood smuggler of Sathyamangalam forests in Tamil Nadu. Biographies of criminals describe the social and personal conditions relating to the criminality of individuals. The drawback of biographies are that a) the author might depend on sensationalism for the sale of his work b) The biographer may highlight certain achievement and defend certain action in order to save the honors of the deceased. This might occur in the case of the author being a friend/relative of the dead man or hired by his family to write. Hence, biographies must be carefully scrutinized before included as sources of data.

iii. Historical Documents

Historical documents deal with events of the past. The events they are recorded as and when they were, taking place. These historical documents occupy a unique place in criminological research and explain the link between social sciences and history. Almost all social researches begin with historical background.

Information collected from the secondary sources, called secondary data may be from internal and external sources. Internal sources refer to the information that already exists. This data might have been compiled at the time of the event by a researcher. The researcher might have collected them after the event, or he might have transcribed the same from the contemporary primary sources or he might have gathered them from primary retrospective sources. The

external sources may consist of both private and public documents, which might have been published or unpublished. Government publications, business references are known as external sources. The private documents comprise the autobiographies, diaries, letters and memories. The public documents may consist of documents published by the journals, magazines, newspaper and other sources. The public or official documents are public records and statistics, published by the governments, historical documents, case histories etc.

iv. Case Histories

Records pertaining to specific cases are available in organizations. Case-works are first hand observations of social behavior. They give insight to the researcher on issues relating to human behavior and social psychology. They are also helpful in studying personality disorders. Case history of Industrial problems or any issues in organizations will furnish information for social research. The disadvantages of case histories are that (a) they are not classified within an integrated conceptual framework (b) they could be biased records as the writer notes down the facts as it occurs or as explained by some one and (c) since they lack uniformity, generalization is difficult.

4.2 Advantages of Documentary Sources of Data

1. Provides an insight into total situation
2. Helps in the formulation of hypothesis
3. Helps in Testing The Hypothesis
4. Provide Supplementary Information

4.3 Disadvantages of Secondary Sources of Data

1. Collected for specific purpose
2. It's an old data
3. Aggregation of data in appropriate units is difficult
4. They may not correlate with the current trends

4.4 Meaning and Nature of Content Analysis

Content analysis is also known as document analysis. Content analysis deals with the systematic examination of current records of documents as sources of data. Data appearing in print are not

necessarily dependable. Therefore, the documents used in descriptive research must be subjected to the same careful type of criticism (historical criticism used for obtaining historical evidence) employed by the historians.

To do an empirical research one will have to gain access to the written records. But it is only the beginning of document analysis. Once, the appropriate written records have been located and gathered, they must be organized and used to inform an empirical analysis. This often requires data reduction that is distillation of a voluminous amount of raw material to a more manageable and informative set of observations. It is this process of data reduction which is described as content analysis or document analysis. For example, a researcher may wish to study the news coverage of a particular type of crime over a period of time. This might require reducing hundreds of newspaper articles and news programmes to a handful of numerical measures to the tone of the news coverage.

4.5 Procedure for Content Analysis

Content analysis has a definite procedure involving four major steps. The first and foremost step in content analysis is deciding what sample of materials are to be included in the analysis. Actually two tasks are involved at this stage:

The first task is to select the materials germane to the researcher's subject. It means choosing the appropriate sampling frame. The second task is sampling the actual material to be analyzed from that sampling frame. Once the appropriate sampling frame has been selected, then all of the possible types of samples like random, systematic, stratified, cluster and non-probability could be used:

Check Your Progress

2. What is the procedure for performing content analysis?

The second step involved in the procedure of content analysis is to define the categories of content that are going to be measured. Suppose we want to study the news coverage of trends in dacoity over a period of time. We will have to categorize the news coverage into favorable, neutral and unfavorable. This is done in order that the news content is measured in relation to the topic under study. Defining the

content into categories related to the topic provides reliability and validity to the project.

The third step involved in the procedure of content analysis is to choose the recording unit. For example, from a given document, news source or other material the researcher may want to code each word, each theme, each character, each sentence, each paragraph of each item in its entirety. When measuring the news coverage of human rights violation by the police the recording unit's information will be useful.

The fourth and final step involved in content analysis is devising a system of enumeration, for the content being coded. The presence or absence of a given content category can be measured or the frequency with which the category appears, or the amount of space allotted to the category of the strength of intensity with which the category is represented.

4.6 Written Records for Content Analysis

The written records which are subjected to content analysis by researchers are of two types namely, episodic record and running record.

i. Episodic Record

Records that are not part to an ongoing, systematic record keeping programme but are produced and preserved in a more casual, personal and accidental manner are called episodic records. Personal diaries, memories, manuscripts, correspondence, autobiographies, biographical sketches, the temporary records of organizations, and media of temporary existence such as brochures, posters and pamphlets usually come under this category.

As we have already seen, to use written records, researcher must gain access to the materials; and code and analyze them. But in the case of the episodic records gaining access is particularly difficult. Locating suitable materials can easily be the most time-consuming aspect of the whole data collection exercise.

ii. Running Record

Running record tends to be produced by organizations rather than private citizens. It is carefully stored and easily accessed and is available for long periods of time. The portion of running record that is concerned with political or administrative phenomena is extensive and growing. The running records include those collected and preserved by the Central, State and Local governments, interest groups publishing houses, press agencies, research institutes and departments concerned. In the case of running records, gaining access to them is easy'. Locating suitable materials is neither difficult nor time consuming because they are carefully indexed and preserved by well-organized establishments with a purpose.

4.7. Advantages of Written Records

Use of written records has the following advantages for the researchers:

1) Written records help researchers to have access to subjects that may be difficult or impossible to research through direct personal contact.

2) Those writing and preserving the records are generally unaware of any future research goal. Thus, these materials are non reactive in nature. The non-reactive aspect of written records helps the researchers to get unbiased "data for their study of a phenomenon."

3) Sometimes the records maintained by well-established organizations such as Tata Consultancy, have existed long enough to permit researchers to compare present trends with past trends. In other word's, it facilitates time series studies in the relevant field of study.

4) Sometimes due to certain constraints, the researcher may not be able to study a larger sample through either interviews or direct observations. Under such circum stances through document analysis of records available with government or other organizations the researcher can increase the size of his sample.

5) As indicated above, use of written records saves a researcher considerable cost and time. To cover a larger geographical area or to study a larger sample through interview, observation or questionnaire

the researcher will have to spend a lot of money and time. If he cannot afford to spend so much of money and spare more time, then the best recourse is to gain access to the available written records on the subject.

4.8 Disadvantages of Written Records

Despite the advantages, the use of written records has its own shortcomings. They are as follows,

1) The first shortcoming of the use of written records are said to be the problem of selective survival. Those who make and preserve records are unaware of any future research goal. This is one of the merits of the use of written records. However, there is a danger that the record keepers may not preserve all pertinent materials. They may sometimes exclude materials, which they think would be embarrassing, controversial or problematic.

2) The second shortcoming is its incompleteness. As might have been noted in the discussion of historical research, there may be large gaps in many activities due to many reasons. The researchers may find it difficult to get from any other sources the correct information, which would fill up these gaps.

3) It is also complained that the content of written records maybe biased. It may be inaccurate or falsified, either inadvertently or purposely.

4) Some written records especially those related to financial or confidential matters are not available to researchers, Several organizations do not allow researchers to probe into their records out of fear of their lapses being exposed or secrecy revealed.

5) Finally, it is said that written record may lack a standard format because different people keep it.

Even though the written records have these shortcomings, yet, researchers have generally found them useful. For them the advantages of using -the written records outweigh the disadvantages. The written record often supplements the data they collect through interviews and direct observation, and in many cases it is the only source of data on historical and contemporary political to administrative phenomena,

Since the use of written record is unavoidable or one of the best source of data, document analysis is found to be one of the most useful data gathering technique for researchers in social sciences.

Content analysis may be used to test hypothesis. The procedure of content analysis involves systematic categorization of content and careful quantification so that hypotheses could be tested. The categorization is made on the basis of themes, values, style and time, which yield quantitative results. Content of books, magazines, newspapers, and radio programs, films, television programs and public speeches can be subjected to content analysis.

The technique of content analysis has improved tremendously owing to the works of Harold Lasswell and his associates. Firstly, the categories used in the analysis to classify the content are clearly defined so that verification of generalization is possible in following research work. Secondly, stress is laid on the researcher to methodologically classify all the relevant materials in his sample taking proper care in sampling. Thirdly, quantitative procedure is used in order to place emphasis on various ideas and provide comparisons of materials.

The sampling in content analysis requires adoption of scientific method. The first tasks is to define the universe. Suppose, the research relates to the newspapers. The researcher has to list all the national newspapers and draw systematic sampling of newspapers that deal with the particular topic, it is proper to classify the newspapers on certain criteria.

4.9 Primary Data

The following are the important tools used by researchers for data collection.

1. Questionnaire method
2. Interview method
3. Schedule method
4. Method of observation
5. Case study method

4.10 Questionnaire

Questionnaire is one of the important tools used by the researcher for gathering data. A questionnaire is a list of questions sent or given to a number of persons to answer. It secures standardized results that can be tabulated and treated statistically.

i.Purpose of a Questionnaire

A questionnaire is used mainly for the following two purposes.

a) To collect factual information.

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

ii.Types of Questionnaire

Questionnaires are usually classified as closed form questionnaires and open from questionnaires. Both types have advantages and disadvantages. Their preference depends upon several factors. Let us see them one by one.

1) The Closed Form Questionnaires

The questionnaire that calls for short responses is known as restricted or closed form. It provides for making a Yes/No, True/False, short response, or checking an item from a list of suggested responses, with a tick mark.

2) The Open Form Questionnaires

Check Your Progress

3. Define the term questionnaire.

Unlike the closed form, the open form questionnaire calls for a free response in the respondent's own words.

Each type of questionnaire has its own advantages disadvantages. Therefore, the investigator must decide which type is more likely to supply the information he wants. It generally depends upon the purpose of research, type of data required, the time available and the skill of the investigator for framing questions and tabulating and analyzing the responses.

iii. Design Of The Questionnaire

The design of the questionnaire plays a vital role in obtaining the needed responses. The following points may be borne in mind while designing the questionnaire.

i) The size of the questionnaire must be small and manageable. The respondent may lose interest in filling out a lengthy questionnaire.

ii) It must have a neat get-up. Special care should be taken with regard to margin, space between words and between sentences, and printing and paper quantity.

iii) Questions should be clear. If there is no clarity in questions the respondent may misinterpret them and supply wrong responses. This is likely to thwart the very purpose of research.

iv) Technical terms and abbreviations should not be used in the questionnaire. All respondents cannot be expected to be familiar with such terms. As a result such questions are likely to be left unanswered.

iv. Precautions in Framing a Questionnaire

1) Use the right question and phrase them properly.

2) Avoid terms that could easily be misunderstood.

3) Be careful in using descriptive adjectives that have not agreed meaning.

v. Test of Reliability of Responses

The reliability of responses obtained, from the questionnaire can be tested by the following ways:

1) The same questionnaire can be sent or given to the same persons after a span of time. If the two replies are the same the questionnaire can be said to be reliable.

2) The same questionnaire can be tried on two similar samples. If the percentages of the responses are similar, the questionnaire can be regarded as reliable.

3) If the majority of the questions are wrongly answered then there must be something wrong either with the questions or with the respondents or with both.

On the basis of the structure, it may be classified as structured / standardized questionnaire and unstructured non-standardized questionnaire.

vi) Structured Questionnaire

In this type of questionnaire there are definite, concrete end preordained questions. Since the questions are framed and printed,

they are presented to the respondents in a uniform manner with same wordings and order. They are perfectly standardized-so that they convey the same meanings to the respondents. The structured questionnaire usually consists of fixed alternative questions. Pauline V. Young defines structural questionnaire as the one which poses definite concrete and preordained questions, that is, they are prepared in advance and not constructed on the spot during the question period.

vii) Unstructured Questionnaire

Relatively less standardized questions are used in unstructured questionnaire. Open-ended questions are used to a great extent. But, this type of questionnaire is used only under certain circumstances where elaborate answers are required. Selection of structured or unstructured questionnaire depends on the research question at hand.

4.12 The Method Questionnaire

The mailed - self - administering questionnaire remains a useful technique in sociological research. When the researcher has to collect information from people who are scattered over different areas, it is not possible for the researcher to go to.,,all these areas to meet one or two of them. For example, if a research aims to study the attitude of IAS officers to collect data. But visiting all the places may not be feasible, especially when the time and funds are limited. He should alternatively mail the questionnaire he has prepared to economize his study. The appropriateness of mailed questionnaire will depend upon the requirements of the research problem with regard to (1) the type of information required (2) the type of respondent reached (3) the accessibility of respondents and (4) the precision of the hypothesis. The mailed questionnaire should accompany an appeal to the respondent, explain the purpose of the research, who is sanctioning the study and a request to the respondents to respond and send it back. It should also contain every detail and directions of filling it up and guarantee of anonymity of the respondent.

4.13 Factors Affecting Response To The Questionnaire

1. Different factors are responsible for varying degree of response which are as stated as follows.

1 .The response to the questionnaire normally differs according to the characteristics of respondent group.

For example educated people are more responsive when compared to illiterate people.

2. Prestige Of The Sponsoring Body

The percentage of response for the questionnaire will be very high if the institution sponsoring it has a good reputation.

3. Importance Of The Problem

If the problems under study are strategically and timely important, a higher response is expected.

4. Nature Of Questionnaire

If the respondents are strongly and emotionally involved in favor of or against the concerned problem, responses may vary. If the get-up of questionnaire is attractive and impressive, the respondents will feel like responding quickly.

5. Size Of Questionnaire

The percentage of response will be high, if small number of questions are asked, rather than large array of questions.

6) Wording of Questionnaire

1. Simple and familiar words must be used.
2. Specific terms should be used.
3. Avoid multiple-meaning questions.
4. Ambiguous questions and words should be eliminated from the questionnaire.
5. Questions that might lead to bias that is leading questions must be avoided.
6. Catchwords, stereotypes and words with emotional bearing should not be used.

Check Your Progress

4. What are the factors that affect the response to a questionnaire?

4.14 Characteristics of a Good Questionnaire

The questionnaire is considered to be of a high standard if its fulfils the following

points.

1. Contain analytical questions
2. Indicate the topic at the top of the form

3. Clear and short.
4. Limited number of questions
5. Necessary instructions to fill up the form.
6. Clarity.
7. Size of the questionnaire must be reasonably short.
8. Good presentation of the questionnaire.

4. 15 Advantages of Questionnaire Method

1. Mailed Questionnaire is the best type of tool when the population to be studied is widely but thinly spread out. The *data* may be collected quickly and at less cost.
2. Since clear-cut instructions are given and the respondent himself is filling it up, it saves the time of the investigator. It also reduces bias.
3. The questionnaire ensures anonymity, and hence the respondent gives free expression.
4. By this method, a large sample may be drawn.
5. Since it reduces bias and prejudice, questionnaire method is more reliable.

4.16 Disadvantages of Questionnaire Method

1. Questionnaire requires the cooperation of the respondent totally, and in case, the respondent is quite unwilling, it is wastage of time and money.

2.The major disadvantage of questionnaire is that it cannot be administered to illiterate people.

3. Since the questionnaire is filled in by respondent himself, there is no check for completeness and accuracy of the data.
4. It is quite uncertain whether the respondent will return the questionnaire.
5 In-complete entries create problem.
6. Due to lack of personal contact, the validity of the information is doubted.
7. No clarification can be made by the respondent while filling it up.
8. Verification is not possible.
9. The respondent gets more time to think and respond which may affect the nature of facts he is giving.

Check Your Progress

5. What the disadvantages of questionnaire method?

9. When the researcher uses questionnaire he cannot combine other methods of data collection.

4.17 Suggestions for its Best Use

Even though the questionnaire has certain inherent limitations it can be used as an appropriate data gathering device if the following points, are borne in mind by the researcher,

1. First and foremost the questionnaire must be properly named. All the principles explained in the beginning of this lesson must be adhered to while framing the questionnaire,
2. The size of the sample should be as large as possible.
3. While mailing the questionnaire to the respondents, postages for responses must be prepaid.
4. Above all, it should be noted that the questionnaire must be used only in cases where response is certain. This will prevent wastages.

4.18 Summary

The data collected by the researcher from libraries, records, office personal records are called secondary data. Personal records are biographies, hand books and letters , public or government official records life histories, historical documents, diaries are also included in the list of secondary data.

Content analysis method is also known as studying the records. In this method all the current records are studied and data are collected. These are four stages in the process of content analysis. The data collection methods of research are questionnaire method, interview method, schedule, observation and case study method. Questionnaires are of different kinds.

4.19 Key Words

Personal Documents	These are spontaneous first person description of one's own experiences, actions and beliefs.
Internal Data	Psychological feelings and conflicts of a person
Questionnaire	List of questions sent or given to a number of persons to answer

4.20 References

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4.21 Answers to Check Your Progress

Question No.	Section No.
1.	4.1.
2.	4.5
3.	4.12
4.	4.15
5.	4.19

4.22 Model Questions

1. Describe the kinds and nature of personal documents.
2. Discuss the disadvantages of written records?
3. Explain the method of content analysis and describe the process of analysis.
4. Explain the method of formulating a questionnaire
5. Discuss the characteristics of a questionnaire.

Unit 5

Data Collection Methods – Contd.

Interview Schedule and Observation

Introduction

This Unit is a continuation of the last Unit. Here the data collection methods interview, schedule and observation are discussed. Interview is one of the important techniques used for data collection in research studies. It is a form of an oral questionnaire. It may be verbal. Instead of writing the response, the subject interviewee, gives the needed information verbally in a fact-to-face relationship. In this Unit the data collection methods are continued.

Objectives

The following aspects of data collection metods are discussed in this Unit.

Types of Interview

g) Preparing For an Interview

i. The Qualities of a Good Interview

Schedule and its features

Advantages and Limitations of Interview

Construction of Questionnaire and Schedule

Types of Observation and

Merits and Demerits of Observation Method

Unit Structure

5.1 Definition

5.2 Types of Interview

5.3 Preparing for an Interview

5.4 Process of Interview

5.5 The Qualities of a Good Interview

5.6 Advantages

5.7 Limitations

5.8 Schedule and Types

5.9 Features of a Schedule

5.10 Requisites of a Good Schedule

5.1 Definition

Pauline Young defines interview as, "a systematic method by which a person enters more or less imaginatively into the life of an comparative stranger". With a skilful interviewer, the interview is often superior to other data gathering devices. One reason is that people are usually more willing to talk than to write.

5.2 Types Of Interview

Interview can be classified into different types on the basis of its form, number, role and approach. Let us try to understand the different types of interview one-by-one.

Check Your Progress

1. What are the types of interview?

i. Based On Form

According to the form, interviews can be differentiated into structured interview and unstructured-interview. They may be explained as follows:

1. The Structured Interviews

The structured interview consists of highly standardized stimuli. The standardization of question ensures that all respondents

understand the meaning in the same way. Usually structured interviews present to the respondent's fixed alternatives to the questions. (For example, Do you support the policy of reservation by the Government-Yes/No (or) strongly support / support / no-opinion / oppose / strongly oppose). Having given' closed end questions, the respondent has to pick up the one that is nearer to his idea. The structured interview may also have 'open-end' questions, in which the position of the questions, wordings and the alterative are exactly the same for all but their respondent has the freedom of giving his own views in his own words. In structured interview, the questions are asked in the same form in same order with no deviation from interview to interview. By doing it this way, comparative analysis between individuals and group is possible. One disadvantage of closed end structured interview is that in depth analysis cannot be obtained. In order to overcome this, an interview guide is used which permits the interview to probe more deeply when the occasion demands.

2) The Less Structured Interview

Standardized interviews are not the appropriate techniques for certain type of research studies. (For example anthropological studies, clinical issues criminological and other type of descriptive studies). In these types of studies neither rigid questioning nor fixed alternative will yield good results. Flexibility is required for such type of problems to be investigated. The flexibility of the unstructured interview helps in eliciting valuable responses like individual motivations and inner feelings. The interview becomes self-revealing rather than superficial.

The demerit of unstructured interview/is that measurement is impossible and chances of comparability is very minimum. The interviews in this type do not follow any predetermined or a lost of questions. The respondents are encouraged to relate freely and frankly their experiences. Therefore, the interviewer must be a patient listener and also the data he collects will be too large to be coded and used. The advantage of this method is that the interview facilitates the respondent to come out with uninhibited response.

Some of the major types of interviews are discussed below.

a) The Clinical Interview

The clinical interview is concerned with the broad underlying feelings or motivation. It is directed towards the courses of individual experiences rather than on any specific feelings or event in his life. Clinical interviews are used by social workers and psychiatrists. For example, the clinical interviews are used in the treatment of drug addicts and hysteria patients juvenile offenders, in order to find out early childhood experiences, neighborhood relations etc.

b) Focused Interview

Clinical interviews are developed toward all experiences of the respondent over a period and then try to hit at a cause for the problem to be solved. In the case of focused interviews, the interviewer directs their attention upon a specific experience and its effects. The interviewer interviews in advance, knows the topics and the questions he has to cover. Interviewer has the freedom to explore motives by laying more stress on the specific event.

c) Non-Directive Interview

The name non - directive is adopted from psychotherapy because here the interviewer is expected to raise a question on a related topic and the respondent has to say what all he feels about it. The interviewer should not interfere, or direct the response. This work is just to encourage the interviewee and be like a catalyst. To get good responses, the interviewer must create a completely permissive atmosphere in which the subjects express their feelings freely.

ii. Based On Number

According to number of persons interviewed, the interviews can be classified as individual interview and group interview. They may be explained as follows:

1) Individual Interview

If a single person is interviewed, the interview is called individual interview. Interpersonal relationship can be established between the interviewee and the interviewer.

2) Group Interview

In group interview, a few or many individuals are interviewed together. It, of course, depends upon the purpose. For instance, when you happen to meet a group of people and would like to gather varied information on a particular subject, it would help you a lot.

iii. Based On Role

According to the role of the interviewer and the respondent at the time of the interview, interviews can be classified as focused interview and repeated interview; They may be explained as follows:

1) Focused Interview

The aim of this interview is to examine particular hypothesis. It takes place with persons known to have been involved in a particular situation. (These persons have seen a particular film, heard a particular broadcast, or have participated in an observed social situation). It refers to situations, which have been analyzed prior to the interview. It proceeds on the basis of an interview guide, which outlines the major areas of the inquiry. It is focused on the subjective experiences-attitudes and emotional responses regarding the particular concrete situations understudy.

The focused interview is regarded as semi-standard. It is because the interviewer is given considerable freedom to express his definition of a situation that is presented to him.

The use of focused interview requires extreme care in preparation and sophisticated handling by skilful interviewers.

Since focused interview gives Importance to the emotions, feelings of attitudes of the individuals in a particular situation. This technique can be used for studying the psychological effects of radio, cinema and TV. etc.

2) Repeated Interview

The aim of this interview is to study the dynamic functions, attitudes and behaviors of certain individuals. It involves interviewing the group again and again. This type of interview is useful in attempts to trace the specific developments of a social or psychological process, that is, the progressive actions, factors or attitudes which determine a

given behavior pattern or social situation. This type of interview requires that the respondents must be permanent residents of a particular locality so that they may be available for interview at any time. But it is a costly affair since a permanent organization has to be set up for this purpose.

iv. Based On Approach

According to the approach of the interviewer, interviews can be classified as non-directive interview and directive interview. They may be explained as follows:

1) Non-Directive Interview

This type of interview is also known as uncontrolled or unguided interview. It is interviewee - centered interview. The interview is encouraged to relate his concrete experiences without any direction from the interviewer. He is allowed to dwell on what ever events seem significant to him, to provide his own definitions of his social situations, 'report his own focus of attention, reveal his attitudes and opinions as he sees fit'. This is a technique by which a lot of information about underground activities can be collected.

2) Direct Interview

It is interviewer-centered technique. !n this technique predetermined questions are used. The interviewer dominates the situation it is also known as controlled or guided interview. The interviewee is not allowed to speak out, as he likes. The interviewer sets out the pattern by which the interviewer carries on his dialogue. The interviewer uses even supplementary questions to elicit the information that he needs. Thus, at every point the interviewer interferes and intervenes in the inflow of information from the interviewee.

5.3 Preparing For An Interview

The preparation for the interview is a critical step in the interview procedure. The successful conduct of interview depends upon how well you have prepared for it. The following points deserve our consideration in the preparation for an interview.

1. The interviewer must have a clear idea of just what information he needs.

2. He must clearly outline the best sequence of questions that will systematically bring out the desired response. A written outline schedule or check list will provide a set plan for conducting the interview.

3. He must seek a prior appointment with the respondents; if this is done the inter viewer can plan his own schedule of programme by according.

4. Before undertaking an interview, the interviewer must gather the names, addresses and particular social habits etc., of the respondents.

5. When the general outline is prepared, the cases, which are to be interviewed, have to be selected by various sampling methods.

5.4 Process Of Interview

The process of interview generally involves the following activities:

1. The interviewer must first and foremost establish a friendly relationship with the interviewee. The nature of the personal relationship between the interviewer and the interviewed require is expertise. The initial task of securing the confidence and co-operation of the respondent is crucial. Talking in a friendly way about a topic of interest to the subject will often dispel hostility or suspicion, if any. This will enable the respondent to freely give the desired information.

2. He must explain the purpose of his interview and explain what information he wants. He must be able to assure the subject that his responses will be held in strict confidence.

3. He must ask questions and elicit information from the subject, if the respondent misinterprets questions, the interviewer may follow it with the clarifying questions. It is also possible to seek the same information in several ways at various stages of the interview. This may help the interviewer to check the respondent's truthfulness.

4. The interviewer can either take written notes during the interview or immediately thereafter. The interview can also be recorded by tape, provided the respondent does not object to it. It is suggested that the

actual wording of responses, may be retained and the interpretation made later.

5) The interview should not be closed abruptly. The most important points should be summed just before closing the interview.

5.5 The Qualities of A Good Interview

The quality of interview technique depends on the skill of the interviewer of the questions. Interviewing itself is an art, governed by certain scientific principles. He must first establish rapport with the subjects properly. He must overcome his hesitation and gain confidence to open conversation with the respondent. He must develop friendly relationship with the subjects, so that they can come out freely with their ideas and experiences. Interviewer should not create an idea *that he is superior to the interviewer*, "*under certain circumstances* he has to satisfy the suspicion of the subject by showing his identity". The interviewer should explain the aim of the interview. The interviewer should carry on the interview without creating tiredness for the subjects and change the questioning order as to suit the emotions of the subjects. The interviewer cannot by satisfy just with writing down the responses. He must make certain while writing that he understands the answer and check whether it is actually the answer to the question. He must not be influenced by bias, prejudices and stereotypes.

The recording of response is also an important part of successful interview. There are two means of recording. If the questions are closed end, the interviewer should only mark the appropriate alternative. In case the questions are open ended then he has to record the response. But, he has to remember that later stage encoding and decoding becomes easier bias may also stem at the situation of interview itself, due to, a) respondent's perception of the interviewer and b) the interviewer's perception of the respondent.

1. Validity of an Interview

1. The interviewer must examine the cost and effect of the relevant aspects of the interview.

2. The interviewer should examine the data from the other sources also.

3. The researcher should know about the attitude of the friends and relatives of the respondent. These details will be hardly while studying personnel problems and relations of the respondents.

4. The interviewer must try to collect facts about the important aspects of the problem. These modalities have to be observed by the researcher to have an accurate conclusion.

5.6 Advantages

The research interview is not a separate and independent technique in scientific study. It is supplementary to other techniques and tools. It is possible to outline the specific advantages of interview as a data-gathering device. The following are its chief advantages.

1. Interview is a means for getting direct information personally. Therefore, the information obtained through interview is reliable.
2. It is possible to study with the help of interview those political and administrative phenomena which are not open to observation.
3. Through an interview it is possible to study abstract factors like attitudes, feelings, opinions, reactions, motivations, hidden decisions and so on.
4. It is possible to study the historical cases and past phenomena by means of interview.
5. Interview is a highly flexible technique. New questions can be formed and cross examination can be done with this technique.
6. Direct interview eliminates personal barrier, brings the interviewer and the interviewee very close, making the study very fruitful and thus giving an opportunity to study the immediate reaction of the interviewee.

5.7 Limitations

Despite the advantages outlined above, interview also has its own limitations just as any other research technique or tool. The following are its chief limitations.

1. Even by the interview technique the correct information may not be elicited by the interviewer. The interviewee may be biased, afraid, unwilling to reveal the truth or emotionally overridden.
2. The interview technique depends too much upon memory and

individual evaluation of concerned problem and the hidden prejudice of the interviewee.

3. The use of this technique is time consuming and a little bit costly.

4. The personal factors and highly delicate matters may not be revealed by this technique.

In spite of the above limitations, interview technique is widely used by researchers. Interview can serve its purpose when handled by a researcher who is intelligent, tactful, shrewd, charming, trained, objective well mannered, co-operative, witty and well versed in human psychology and intuition.

5.8 Schedule and Types

In this section, the meaning, features, types, requisites of good schedule, construction of a schedule and its merits and limitation, are discussed.

A schedule is a list of questions being filled by the enumerators who are specially appointed for the purpose. Schedule is the name usually applied of a set of questions, which are asked and filed in by the investigator in a face-to-face situation with the other person. The major difference between a questionnaire and the schedule is that as regards the former, the respondent fills in himself and as regards the schedule the enumerator or the investigator fills in.

Schedules can be classified into five types according to the purpose for which they are used. They may be outlined as follows,

Check Your Progress

2. State the classification of a schedule.

1. Observation Schedule

This is used by the investigator at the time of making his observation of a Problem.

2. Document Schedule

This is used by the investigator during his content analysis or document analysis.

3. Rating Schedule

This is a list of questions used by the investigator for rating or measuring attitudes, opinions and behavior.

4. Evaluation Schedule

This is used by the investigator to collect data for studying the immediate problems of some institutions or agencies. Evaluative studies are diagnostic in nature and they supply feed back for suggesting corrective measures.

5. Interview Schedule

This is a list of questions used by the investigator while he is interviewing another person or the respondent.

Interview guide is a list of points or topics, which an interviewer must cover during the interview. Unlike the interview schedules in the interview guide, considerable flexibility may be allowed as to the questions order, and language in which the interviewer asks the questions.

5.9 Features of a Schedule

There are three distinctive features as far as a schedule is concerned. They are:

1. Schedule as a list of questions is a mere document and it will not be as attractive as a questionnaire, after all, it is going to be with the investigator only.
2. The schedule can be used in a limited area of research only.
3. As far as the schedule is concerned, the questions are put directly to the respondents by the investigator and the answers also are noted down by him.

5.10 Requisites of a Good Schedule

Accurate communication and accurate response are the two requisites of a good schedule. By using the schedule the investigator must be able to convey to the respondent what he thinks to convey. The respondent must understand whatever question is put to him and respond properly. So much care must be taken in the construction of the schedule. Above all, the investigator must handle the too! in a very sophisticated and skilful manner.

i. Construction of a Schedule

While constructing the schedule the investigator must bear in mind the following points:

1. The investigator must have a thorough knowledge about the problem for the study of which he is to use the schedule.

2. The investigator should know what information he wants and what information he does not want.

3. The schedule should have a proper design. Normally it should include the following features:

I) Introductory part -This should have in it the name of the survey, address of the surveyor serial number of the case, place of interview or observation etc.

ii) Instruction part - This part should carry instructions to the investigator or enumerators for using the schedule.

iii) Main part - It is the part which should carry the question that are to be put to the respondents and the responses or space to responses to be marked in by the user.

4. The fourth point to be borne in mind while constructing the schedule is proper sequences. The various items that are asked about should be arranged in a sequential order so that there will be coherence and cogency in the responses collected for research.

5. Finally, a try out is necessary. The schedule thus constructed should be tested on a sample and refined. This will ensure its reliability and validity.

6. While framing the questions for a schedule, the various principles applied for framing a questionnaire should be strictly adhered to buy the investigators.

Just as any other data-gathering device, schedule also has advantages and limitations.

Check Your Progress

3. What are the advantages ofa schedule?

5.11 Advantages of a Schedule

i. Answers obtained through a schedule are not biased because of the presence of the investigator.

ii. Percentage of response is higher when compared to a questionnaire.

iii. Unlike the questionnaire, in a schedule, abbreviations can be used and this saves time.

iv.The field worker can process more deeply, if it is necessary.

v. Presence of human element makes the process more interesting.

vi. Schedule can be used for collecting information from literate respondents.

5.12 Limitations of a Schedule

i. The presence of the investigator may sometimes become a source of fear for the respondents. So the respondent may not reveal his ideas.

ii. In some cases, the respondents may be influenced and there by the information given may be biased.

iii . It is said that the schedule can be used only for a very small area.

iv. It requires a large number of well trained field workers, and hence, it is considered as very expensive.

Despite the limitations inherent in it, schedule is used a tool of research for the purpose of data gathering by majority of researchers.

5.13 Construction of Questionnaire and Schedule

It is generally a frustrating experience for a researcher to construct a schedule or a questionnaire because it involves a number of factors to be taken into account. The question frame may not elicit the response expected. The respondent may not understand the meaning of the question hence, the researcher must spend time and think carefully while constructing the schedule. Schedule is the term usually applied to a set of questions, which are asked and filed in by the interviewer in face-to-face situation with another person. Questionnaire refers to a device for securing answers to questions by using a form, which the respondents fill in himself. An interview guide is a list of points or topics which an interviewer must cover during the interview. The interview guide uses a great proportion of open-ended questions. The schedule and questionnaire contain structured stimuli.

The schedule normally consists of both closed and open end questions as it becomes essential to use both depending on the nature of response we want. In the construction of a schedule or a questionnaire certain aspects are to be considered carefully.

1. The length and the scope of the schedule must be limited, an interview should not be too lengthy to create fatigue among the respondents. Therefore, repetitions and unnecessary questions should be avoided. The hypotheses or the objectives of the study must be

meticulously studied and the relevant questions should be framed. The researcher himself understands the problem and then tries to bring out the response from the respondents in a logical sequence.

2. The list of questions must be given to the experts in the field who will check it. This will increase logical relationship.

3. Personal questions and embarrassing questions may be avoided or asked in a subtle manner or at the end of the interview schedule.

4. More complex questions that require thinking should be placed at the end of the questionnaire.

5. The questions should not jump from aspect to aspect but should be framed to follow an order and sequence.

6. The questions should not contain two aspects in a single question; One question should talk about one aspect of life (E.g. Do you write your assignments and rest in time?)

7. Suggestive questions should not be used. For instance, Good students do their, assignment in time. (Give your opinion)

9. The questions must be framed in such a way that the responses are comparable and reliable.

9. The schedule must start from general and broader questions and slowly come down to personal questions. This is called funnel type questions.

10. Cross-check questions should be used in between in order to verify the responses given by the respondent to earlier questions.

11. Sensitive questions should not be included. But they may be asked indirectly.

12. In places where it is necessary, questions should be asked which sift out those who need not or cannot answer the question because they do not possess the necessary knowledge required. These questions are called sieve questions.

Apart from these factors, the investigator should take proper care in the appearance of the schedule, especially when it is used as a questionnaire. The quality of the paper must be good. The printing must be clear. Enough space must be given for open-ended questions.

The schedule or the questionnaire should be checked for completeness, relevance and adequate content. The pilot study may be launched as a step preliminary to the formulation of the complete schedule and this will help in checking it for adequacy. The pretest is done after the completion of the preparation of schedule and it helps, the researcher to modify the stimuli in a relevant manner and frame a complete schedule.

5.14 Observation and Components

Observation is one of the basic methods of getting information. In social research in our daily life, we get to know about things and events by seeing the happening around us. Observation is a scientific observation (a) has a formulated research purpose (b) is planned systematically and (c) subjected to checks and controls on validity and reliability. Through direct observation of appropriate situation, social scientists, could obtain the data required. Karl Weiek defines observation as method consisting of "the selection, provocation, recording, and encoding of that set of behaviors and settings concerning organisms in situ which is consistent with empirical aims" The phrase - 'in situ' refers to those situations in which the participants spend most of their time.

Observation method is used in development psychology on issues relating to police-public relationship, which is studied under experimental conditions. Anthropologists use observational method extensively in their research relating to tribal communities. Psychology and social psychology also adopt observation technique in laboratory or natural setting to study individual and group behavior. Topics like mob behavior are studied through scientific observation. Another area of research that increasingly makes use of observation method is the field of evaluation research, that aims to evaluate social programs. The researchers keep accounts of their observation and evaluate the programs.

Check Your Progress

4. Explain observation as a method of data collection.

The reasons for using observational method are that they tell us about behavior pattern of people. Descriptive materials collected through observational method provide information on behavior of

human beings under different circumstances. (For instance behavior of children under play situation and classroom situation), In certain types of research, like mob behavior, performance of certain ritual - and customs etc. could be studied only through observation. Observation may be used in experimental studies designed for testing hypothesis.

Observation has three components, namely sensation, attention and perception. Sensation is derived from sense organs. The accuracy of observation depends to a great extent on the power of sensory organs like eyes, ear, nose, etc. Attention is related to the ability to concentrate on the subject matter of study. Perception enables the mind to recognize the facts, drawing upon experience and introspection. Accuracy of observation depends on knowledge and experience. However, the initial knowledge may sometime prejudice the observation, but proper training and observer's cultivation of the habit of unbiased approach to the problem can reduce it.

5.15 Types of Observation

Before conducting observational research, the investigator has to decide how he is going to observe and how the data is to be recorded. Observation may take place in natural setting or in laboratory condition. The researchers, role in the event could be either participating in it or just an aloof observer reporting about it. Depending on these factors scientific observation may be classified under three major types.

1. Controlled / Uncontrolled observation
2. Structured / unstructured / partially structured observation
3. Participant or non-participant / disguised observation

What type of observation technique the researcher selects depends on the research problem (or the topic to be explored). The researcher must be sure about four conditions of observational research setting a) what should be observed, b) how the observed event should be recorded, c) how to insure accuracy of observation and d) what type of relationship is to be maintained between the observed and the observer. The observation method can be explained pertaining to the way they are structured.

iii. Structured Observation

Structured observation consists of a) careful definition of standardization of situation to be observed b) type of information to be recorded and c) the procedure of recording. All these factors are well defined in advance. Structured observation is used usually to test causal hypotheses in experimental used system of recording is to maintain sheets that contain categories to be coded. In modern days mechanical instruments are used for recording; Use of audio tapes and video camera's becoming common in observational technique. This has also created the reliability of the data.

Reliability in observation could be achieved by the standardization of the instrument. But there is specific problems of reliability in observational method.

a. The first problem relates to the inadequate definition of the behavior that corresponds to the concepts of the study. That is several behaviors may be taking place in the situation and they may give different reference and meaning different observers.

b. Secondly, the problem of reliability that may arise due to the doubts in marking/ recording the behavior in different pre - determined categories. The researcher himself should have confidence in marking the given categories (for example facial expression, way of smiling might give different meaning at different condition)

c. Thirdly, there are errors introduced by the observer because of the distortion of his perceptions.

d. Fourthly, bias may enter in recording due to overloading work of the researcher.

The problem of reliability and bias will increase if the researcher is going to employ more than one investigator. Each one might perceive things differently. Therefore, proper training must be given to the investigators.

1) Direct Or Indirect Observation

Under direct observation, actual behavior, verbal or nonverbal is observed first hand. For instance, to study student behavior in a particular situation you may just go and watch than why they are

behaving so in that situation. Here you see their actions with your own eyes and hear their views with your own ears. This is an example for direct observation.

On the other hand, you can visit the place after the students have left. From the traces they have left, the way the chairs are arranged or disarranged or from other sense, we can guess how they would have behaved in that particular situation. This is an example for indirect observation. So under indirect observation, the results or physical traces of behavior are observed.

2) Participant Or Non-Participant Observation

Under participant observation, the investigator is a regular participant in the activities of the group being observed. For instance, when you want to observe the election campaigning done by a voter, you may also participate in the campaigning and make your observation by being a member of the campaigning group. In this case your observation is participant observation.

Under non-participant observation the observer does not participate in group activities or become a member of the group or community. In the example we cited above, if you do not participate in the campaigning process and still observe it by simply being an on looker then your observation is non-participant observation.

3) Overt Observation Or Covert Observation

Check Your Progress

5. Explain the method pf Participatory observation

In overt observation, those being observed are aware of the investigator's presence and intention. A girl was proposed to a boy for marriage. He wanted to see the girl before marriage. He and his friend went to her house after giving advance information about their visit and saw the girl and observed her behavior. Here the observation is overt in nature.

Suppose, the boy observed her at a distance while she was going to a church or temple without letting her of his intention or presence, then his observation is called covert observation. The investigators presence is hidden or undisclosed, or his or her intentions are disguised.

iv. Unstructured Observation

This type of observation is relatively unstructured and flexible. Unlike structured observation, unstructured observation is less standardized in terms of recording and other aspects. Normally unstructured observation is used in exploratory design where the investigator is not quite familiar with the situation and does not know the advances in situation are relevant or not. Therefore, he must be very much alert and modify his focus of observation. Such shifts in focus according to the exigencies of the situation is the important feature of unstructured observation. The researcher should take the cues from unanticipated events but this does not mean that there is no planning at all. Instead, the observer has to decide certain things prior to the beginning of his research. For instance, if the research topic is concerned with rituals of marriage practices, then he has to be prepared to observe the following events.

a. The observer should see who the participants are, how many are they and the relationship between them.

b. He must understand the 'Setting'. He just cannot enter into the field without any idea about it.

c. The purpose of the gathering should be studied in advance. The focus on the courses of the event could be modified later as per the research aim.

d. In observational method, the researcher should decide when the recording should be done and how it should be done.

The recording may take place either on the spot or after the event had taken place. On the spot recording is good because it is done while the event is going on. This will minimize bias and distortion through memory. But there are certain occasions/situations in which recording is not suitable while it takes place. The party concerned may not like a stranger to record it (for example the ceremony). Sometimes it will distort the attention of the investigator between observing and writing. In situations where on the spot recording is not feasible, the investigator may do it after the event has occurred or, he may retire from the place and record it from his memory. Although this type of

recording is suitable under certain circumstances, it has one disadvantage. The researcher may not remember ail the details of the situation because of the limitations of human memory. He is likely to miss important details.

e) Another important factor to be ensured in observation method is the accuracy of observation. In modern days, the use of audio tape recorder and video pictures increase the accuracy of observation. Use of these equipments is not always possible. Then in order to check the accuracy and completeness of the record, the researcher should compare it with the record of other observers. Employing more than one observer on the same situation and later checking it up will ensure accuracy. Or the same observer could observe the situation more than once. This will also be helpful. Use of more observers also has certain limitations. If the observers come from the same background, then they will share the common bias.

v. Relationship Of The Observer

The relationship, the researcher is going to maintain with the subject is an essential component of observation method. In sociological research, the researcher can act as a participant observer or non-participant observer. This idea was introduced by Prof-Edward Lindemao. He felt that just by asking questions the researcher may not get a full picture of the issue or the practice. He opined that the researcher should watch the subject if he wants to know the actual situation.

vi. Participant Observation

In participant observation, the researcher shares the life of the group he is observing. Usually anthropologists choose to be participants among the tribal groups or rural people so that they accept them as friends. Nel Anderson adopted participant observation among Hobos which enabled him to develop insights in his study entitled, 'The Hobos'. Another example is the work. The Street Corner Society. Its Author, W. P. Whyte intimately associated himself with the subjects to write about their activities.

vii. Non-Participant Observation

The researcher places himself relatively at a detached position of the subject. They will not participate in the activities of the group or the event he is observing. Usually in research work conducted-among children in an experimental condition, the investigator prefers to stay aloof and watch the behavior of children while playing (or any other activity).

The researcher has to decide whether he is going to conceal his observation from the subjects or not. The subjects are not made aware of the fact that they are being observed. One of the main reasons for concealment of the investigator from the subjects is that the behavior of the subjects is not influenced by their knowledge that they are being observed. Even participant observation the researcher might conceal the purpose of his research. He may enter into the community as a botanist or a journalist. Anthropologists follow this method. Sometime, the researcher may even choose to conceal his identify fully. For instance, he might enter in disguise. Which type of observation technique he is going to select depends on the research problem and the setting.

The participant and non-participant observation have their own merits and demerits.

5.16 Merits

Firstly, since the research purpose is not known to the subjects in participant observation, the investigator can record the event in natural behavior pattern. The behavior is not influenced.

Secondly, as the researcher is participating in the activities of the group, he has access to all the minute details of the event, which he could not easily get just by merely looking at it.

Thirdly, in participant observation, the researcher could record and explain the context and it's meaning with greater richness and depth because he is involved in the event. He can also check the truth of the statements made by the subjects while observing them.

5.17 Demerits

Participant observation has certain limitations also. By becoming the participant of the group, the range of experience and scope is limited for the researcher. He may occupy a distinct place in the group, which may affect the group activity. This involvement might lessen the sharpness of his observation. Sometime, if the researcher has too much involvement in the activity for a long period then it might reduce his objectivity. The emotional attachment for that group might result in bias.

5.18 Field Notes

The researcher is required to keep field notes to make the data collection useful. Lofland describes a series of steps helpful in developing field notes. At the first instance, the researcher tries to make mental notes of what is observed. The second step is to note down the events, words, gestures etc in a note book. Full field notes are the pieces of short notes converted by the researcher in to full/complete explanation of the events after it is over.

5.19 Demerits of Checklists

The use of checklists makes the research more reliable and scientific. Brand differentiates between two types of checklists. The static checklist consists of information on age, sex, race etc. while the action .checklists, is used to record actual behavior. In these checklists, the researcher tallies his observations and the behavior of the subjects.

5.20 The Advantages of Observation Method

1. The observation takes place as and when the event is taking place.
2. Many of the behaviors of people cannot be explained in verbal system. Such things may be studied/recorded in observational method.
3. Observation technique may be used among subjects who cannot give a verbal report (Children).
4. It needs less co-operation of the subjects.

5.21The Limitations of Observation Technique

1. The influence of unforeseen factors.
2. The duration of the, event could be too long to continue observation.

3. People of a community many not permit the researcher to observe all the events of their culture.

4. The observational data cannot be quantified. But, this limitation is overcome in the present social research.

5.22 The Difficulties of Observation

The main barriers for perfect observation and recording are (a) inadequacy of human sense organs (b) the difficulty of inference from observation and (c) the impossibility of observing an event without influencing the human being involved in it.

In social sciences, observation is one of the important methods of acquiring knowledge. The observer has to ensure that his observation is more or less accurate. People, individually and collectively do not behave in the same way under similar circumstances. They behave differently under similar situations. Human behavior and their choices are highly volatile. There cannot be any single law or tendency to explain human behavior. Their actions may be rational or irrational or both. In social sciences, the method of measurement is not ideally developed. As a result, observation to some extent is bound to be incomplete and inaccurate. There is no standard procedure yet evolved to construct procedural tools. In order to have both inside and outside views, it is necessary in social science research, to resort to both participant and non-participant types of observational techniques. However in social science research, observation plays an more important part than experiment.

Human beings may behave differently when they are aware that they are being observed. It is better to keep person unaware of observations. In order to find out the actual or normal behavior of persons, the observer may be a participant without revealing his identity. However participation may lead to the loss of objectivity. This should be guarded against. The Behaviorist school of Psychology lays a great emphasis on this type of observation as the best way to know human behavior.

5.23 Summary

This Unit is a continuation of the earlier Unit4. The data collection methods are discussed here further. In this Unit the primary data collection method interview and other aspects are discussed. In the face to face interview, the questions are put to sample respondents for eliciting his replies.

In the method of schedule questions are put by the researcher to the sample respondents and the emerging replies from them are recorded in the schedule format by the respondent.There areseveral kinds of schedules.

In the observation method the selection, inducing, recording and observing the activities of the audience are carried out. There are several methods in observation. Field notes are the pieces of short notes converted by the researcher in to full/complete explanation of the events after it is over.

5.24 Key Words

Interview	A form oral questionnaire
Clinical Interview	It probes the broad underlying feelings or motivation of the respondent.
Schedule	A schedule is a list of questions being filled by the enumerators who are specially appointed for the purpose.
Observation	It is a method consisting of the selection, provocation, recording, and encoding of that set of behaviors and settings concerning organisms in situ which is consistent with empirical aims
Field Notes	Pieces of short notes taken by the researcher at the time of field survey to be converted into full/complete explanation of the events after it is over.
Checklist	It consists of information on age, sex, race etc. of the respondent.

From this the researcher tallies with the actual behaviour of the sample.

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5.26 Answers to Check Your Progress

Question No.	Section
1	5.2
2	5.9
3	5.11
4	5.14
5	5.15

5.27 Model Questions

1. Explain the types of interviews based on form.
2. State the nature of the preparation of an interview and itsprocess.
3. What are the qualities of a good interview?
4. State how a questionnaire and interview are constructed?
5. Explain the various types of observation.

Unit 6

Scaling

Introduction

With the development of social sciences, intuitive judgment is no longer a reliable means of measurement. Objectivity as one of the essential characteristics of scientific method has been used as a reliable means of measurement.

Social science data are often qualitative in nature. Conversion of qualitative data into quantitative data involves abstraction of a particular aspect of a phenomenon, neglecting the remaining aspects. For example, the intelligence is best measured by the intelligence quotient (IQ) of a person but neglects aptitude, creativity, motives values and all other aspects. Yet, it is a useful aid in assessing a person's intelligence.

Abstraction of a particular phenomenon as an indicator provides the basis for inference. A scale is a graduated measure. Measurement involves scaling which is a more complex procedure.

Objectives

In this Unit, the following aspects of scaling are discussed.

Scaling Concepts and Measuring Instruments
Approaches to Scale Development
Types of Scale Measurement
The Attitudes and Their Measurement
Types of Attitudinal Scales and
Multiple Item Scales

Unit Structure

6.1 The Concept of Measurement and Scaling

Measurement can be defined as a standardized process of assigning numbers or other symbols to certain characteristics of the object of interest according to some prescribed rules.

Mostly, measurement deals with numbers because mathematical and statistical analyses can be informed only on numbers and that they can be communicated throughout the world without any language probe. Measurement is considered as a standardized process because there is one to one correspondence between the symbol and the characteristics in the object. Secondly, the rules for assignment should be invariant overtime and the objects are measured on this basis.

Scaling is the process of determining the quantitative measure of abstract concepts like leadership style, brand image of a product.

This procedure implies assigning numbers to a property of an object to impart some of the characteristics of numbers to the properties studied.

A scale consists of a set of statements, logically related, referring to the same attitude that is being studied. Scales are used to study simultaneously a number of observations on each respondent. Individually these observations are not useful. It is the total picture that helps. So by employing one of the various scaling procedures a respondent can be assigned a number to indicate his position on the scale.

A scale may be used to measure characteristics of a respondent or to evaluate an object presented to him. Thus, for example, we may try to measure the perceptions of executives on the social obligations of the business or we may ask them to rate their subordinates, certain qualities.

The merit of a scale depends on to what extent it satisfies the principles of measurement. It should satisfy, the principles of homogeneity, linearity, reliability and validity. There is no such best scale that satisfies all these principles. Each of the available scales has certain desirable features and each one is open to criticism. So, the best method is one which is most appropriate to a particular problem. Depending on researcher's needs he has to choose a suitable scale. Suppose he intends to study attitude pattern, Likert scale will be relevant. If he wants to study attitude change, Guttman scale will be preferable and so on.

Check Your Progress

1, What are the uses of measurement scales?

6.2 Approaches To Scale Development

There are five major approaches by which scales are developed. They are:

1. Arbitrary Approach
2. Consensus Approach
3. Items Analysis Approach
4. Cumulative Scale Approach
5. Factor Analysis Approach

i. Arbitrary Approach

When a researcher develops the scale on an ad hoc basis it is called arbitrary approach. He collects a number of statements which he believes as unambiguous and appropriate to a given topic. He chooses some of them and forms the scale. This approach is easy and can be adopted for developing any kind of scale, rating or ranking subjective or objective. The major weaknesses of this approach are:

a) Their reliability is based on respondent's subjective logic.

b) It is based on the assumption that the statements chosen are representative of the universe of content. There is no indication that the respondents are aware of the fact their responses form part of a research project.

ii. Consensus Approach

In this approach, the selection of statements is made by a panel of judges who evaluate the proposed scale items and determine:

a) Whether they come under topic area.

b) Whether they are meaningful and unambiguous

c) What is the level of attitude that the scale item represents, Thurston's differential scale is developed in this way.

iii. Item Analysis Approach

This approach relies on the analysis of actual responses to statements as the basis for determining their acceptability. They are evaluated on the basis of how well they discriminate between those persons whose total score is high and those whose score is low. The Likert scale is developed in this way.

iv. Cumulative Scale Approach

The cumulative scales consist of a series of statements to which a respondent expresses his agreement or disagreement. The statements are related to one another in such a way that an individual who replies favorably to say item no 3 also replies favorably items no. 2 and 1 and one who replies favorably to item no. 4 also replies favorably to items no. 3, 2, 1 and so on. This being so, an individual whose attitude is at a certain point in a cumulative scale with answer favorably all the items on the side of this point and answer. Individual's score is worked out

by counting the number of points concerning the number of statements he answers favorably. If one knows this total score, one can estimate as to how a respondent has answered individual statements constituting cumulative scales. The major scale of this type is the Guttmann's Scalogram. This approach is complex and is not widely used.

v. Factor Analysis Approach

Factor scales are designed to inter-correlate items to determine their degree of interdependence and thereby give meaning to a set of variables. Osgood's semantic differential scaling and multidimensional scaling are some of the technique in this category. Though, these techniques are versatile research tools, they are still not being widely applied to read business problems.

The scaling techniques have come into being because of a need felt by the social sciences to quantity the data which are qualitative in nature. The quantification of the data facilitates the establishment of scientific laws.

6.3 Types of Scale Measurement

There are four types of measurement scales as follows.

1. Nominal scale
2. Ordinal scale
3. Interval scale
4. Ratio scale

Check Your Progress

2. What are the types Of scale measurement?

1. Nominal Scale

This measurement is based on the identity of the objects. Similar entities or objects are assigned the same number as they are identical with respect to nominal variable. Sex of persons can be identified as male and female, marital status-like married and unmarried and they can be accorded similar number. Thereby, it will be easy to count the numbers under a particulars category.

2. Ordinal Scale

This scale is obtained by ranking objects or by arranging item in order with regard to some common variable. For instance, objects can be ordered as the highest, second, third, fourth in ranks. This

ranking procedure helps one to know whether each object is more or less of this variable than some other object. The ordinal scale indicates the class level of each object and the relative standing of the two objects when compared. Ordering of students by ranks, ranking of the horses that took part in a horse race are some of the examples of ordinal scale.

3. Interval Scale

The third property of the scale numbers is that the intervals between the numbers are equal. With this scale the differences in the interval of the objects can be compared. For example, the difference between 1 and 2 is the same as difference between 3 and 4. In an interval scale not only the positions of objects or persons arranged in terms of greater, equal or less but also the units of measurements are equal.

4. Ratio Scale

This scale of measurement in addition to having the characteristics of an interval scale has a natural or absolute zero point. This scale is able to measure the complete absence of trait in a person or object. This scale helps us to make comparisons of absolute magnitude between objects. This type of scale often called fundamental measurement is most commonly found in physics.

6.4 Attitudes And Their Measurement

Attitudes are the mental orientation of individuals regarding the way in which they respond to their environment. There is always a need to know about the basic orientation or attitude of the present or prospective customers. Their attitudes are based on the information they have, their feelings and their intended behavior. Attitude measures offer greatest advantage over behavior measures in their capacity for diagnosis or explanation. This lesson is primarily concerned with the measurement of attitudes, as they are highly important to marketing. The lesson also deals with the special problems of specifying and identifying attitudes.

There are three related components that form an attitude.

1. Cognitive or knowledge component: It represents a person's information about an object regarding its presence in the market, its characteristics and judgment about the characteristics of the object.

2. Affecting or liking component: This summarizes a person's over all feelings towards the object, situation or person on a scale like like-dislike, favorable or unfavorable.

3. Intention or action component: It refers to a person's expectations of future behavior toward an object.

6.5 Types Of Attitudinal Scales – Sociometric Scales

The various attitudinal scales are classified into single item scales and multiple item scales. These are also known as sociometric scales as they are concerned with social attitudes. Under the single item scales the following are included categories.

I. Single Item Scales

1. Itemized Category Scales
2. Rank Order Scales
3. Comparative Scales
4. Constant Sum Scales
5. Sort Scales
6. Pictorial Scales

Check Your Progress

3.State the types 0f attitudinal scales.

1. Itemized category scales

There are four levels of satisfaction from which the respondents can choose to indicate their over all level of satisfaction with any program of the government such as:

a) Very satisfied b) quite satisfied c) somewhat satisfied d) not at all satisfied.

In this, the respondent is forced to make a choice. There is no provision for natural opinion or expressing ignorance. The scale is unbalanced as there are more balanced than unbalanced categories.

2. Comparative Scale

The categories of opinions are labeled as "excellent", "very good", "good", "fair" and poor. In this scale, the responses alternatives generally are inadequate in that they are incapable of transmitting very much information.

3. Rank Order Scale

These scales require the respondent to arrange a set of objects with regard to a common criterion; viz., advertisements in terms of interest, product features in terms of importance etc. ranking is widely used in surveys in the choice of brands, flavors, product variation and others.

However, they are most difficult rating scales because they involve comparison and require more attention and mental effort. It is' also noticed that respondents cannot meaningfully rank more than five or six objects.

4. Q-Sort Scaling

When the number of objects or characteristics that are to be rated or ranked is very large, it becomes tedious for the respondents to rank order or a part-wise comparison. In Q-sort scaling each respondent is handed hundred cards each, containing a product with various features. The respondent is then asked to sort the cards into 12 different piles, in such a way that one pile contains what they feel is the most preferred among the products that have been developed and the other pile contains the least preferred of the products that have been developed. The other pile of a card containing products that varies gradually from those with higher reference to those with lower preference. The respondent is asked to rank order only those products in the most preferred pile or in the few sets of piles. As a relatively large number of groups or piles are used, it increases the reliability or precision of the results.

5. Constant - Sum Scale

This scale requires respondents to allocate a fixed number of rating points among several points (usually hundred) to reflect the relative preference for each object. It is widely used to measure the relative importance of attributes. The scale is limited in the number of objects or attributes it can address at one time. Respondents sometimes have difficulty in allocating points accurately among more than few categories.

6. Pictorial Scales

In these scales the various categories of the scale are depicted pictorially. The respondents are shown a concept or read an attitudinal statement and asked to indicate their degree of agreement or interest by indicating the corresponding position on the pictorial scale. The pictorial scale should be designed such that the respondent can comprehend and will enable him to respond accurately. These scales are used mainly when the respondents are young children or illiterate people.

Uses

These attitude rating scales are widely used to test the advertising copy or compare the performance of the new model concept and segment markets. They are an ad hoc judgment based on the researcher's preferences and post experiences in similar situations. The researcher will have to decide on the following issues while designing an attitudinal scale. They are;

1. Number of categories
2. Types of poles used in the scale
3. Intensity of the adjective to be used like "extremely colorful", "very colorful", and "colorful".
4. Labeling the categories
5. Balance of the scale.

6.5.1 Multiple Item Scales

Attitudes towards complex objects like credit instruments, health plans, automobiles have many facts. It is often unrealistic to capture the full picture with one over all attitude scale question. Beliefs in any specific issue aspect, or characteristic are useful indicators of the over all attitude, there may be unusual reasons that make the single belief unrepresentative of the general position. To cope up with the problem a variety of methods have been developed to measure a sample of beliefs toward the attitude object and combine the set of answers into some form of average score. The most frequently employed of these methods are Likert, Thurstone and Semantic differential scales.

Opinion scales are methods of measuring the attitudes through the medium of opinions. The opinion scale reveals the reactions of the individual, towards some particulars things and from these reactions his attitude can be deduced. The scale should be so devised to throw maximum possible light upon the attitudes of the individuals. Many forms of opinion scales are used in Psychology. Main among them are;

1. Likert scale
2. Thurstone scale constructs method
3. Semantic differential scale
4. Bogardus scale
5. Gutman's scale construction method

These scales are discussed below

6.5.2 Likert Scale

Likert rating scale consists of a number of statements, which express either a positive or negative attitude towards the object of interest. The respondent is asked to agree or disagree with each statement. Each response is given a numerical score to reflect its degree of attitude favorable. The scores are totaled to measure the respondents attitude. The responses may be obtained using different scale points ranging from 3 to 7. Most Likert scales are constructed with 5 scale points. For example, in a study of repentance of criminals, one of the statements may be formed as below.

Many times I feel why I did this murder.

Strongly Agree	Agree	Undecided	Disagree	Strongly disagree

i. Steps In The Construction Of Likert Scale

Construction of Likert Rating scale consists of the following five steps:

1. Collecting statements
2. Statement wording
3. Pilot study
4. Scrutiny and editing and

5. Final selection of statement

1. Collecting Statements

Attitude or opinion question are more sensitive to changes in words, context and emphasis. So we should not rely on a single question to measure attitudes. We should have a set of questions that give more reliable or consistent results. Hence, assembling the required statements is the first step. Those employed in the final scale will be selected from this. How these statements do are collected? Here, the researcher's knowledge and the review of literature help a lot. Informal interviews with respondents, consulting experts in the field are useful. The statements collected must be differentiated as expressing a favorable or unfavorable attitude.

2. Statement Wording

A greater care is required in forming sentences. Excessively, complex sentences, ambiguous words, sentences with double negative are to be avoided. Use short and uncomplicated classes. It is better to use phrases relating to feelings, emotions, fears, hopes and wishes. Sometimes, quoting the attitude statement in the language familiar to them will be useful.

3. Pilot Study

How do we choose items to be included in the final scale? This choice is made based on a pilot study. In pilot study, 10 or 20 interviews are to be conducted to identify a cluster of attitudes, their linkages and possible under currents. These respondents must be similar to those who are going to be studied. They are asked to read each statement and state their level of agreement on a five pint scale.

Check Your Progress

4. What are the steps in the construction of a Likert Scale?

4. Scrutiny and Editing

To check the suitability and appropriateness of statements, the pilot study results are to be scrutinized and edited. Look for statements for which most respondents state 'uncertain' or 'do not know' as their responses, statements that are skipped or crossed out or those for which corrections, changes or additions are made. These statements are unsuitable or worded faulty or ambiguous. So they are to be

discarded or modified. From the remaining, the final selection is to be made.

5. Final Selection Of Statements

The final selection must ensure that the universe of content is adequately covered. The choice is a kind of sampling problem.

6.5.3 Thurstone Scale

This method is also known as the method of equal appearing intervals since the objective is to obtain a uni-dimensional scale with interval properties. The first step in this method is to generate a large number of statements or adjectives, reflecting all degrees of favorableness towards the attitude objects. These statements could be got from a search of literature, discussions with knowledgeable people, personal experience or in any other ways. After editing, a group of representatives known as judges will be chosen. They will be asked to sort the statements into the degree of favorableness. viz., very favorable and unfavorable. Ambiguous statements are discarded. The items that will best cover the range of attitudes are selected at equally spaced intervals. These reduced set of items may then be aggregated usually by summation into a scale of 10 to 20 items that are distributed uniformly along the scale of favorability.

The scale is then administered as part of a survey by asking each respondent to select those statements which best reflect his or her feelings towards the attitude object.

Thurstone scale is both time consuming and expensive to construct. But it is easy to administer and requires a minimum of instructions.

6.5.4 Semantic - Differential Scale

This scaling procedure is used widely to describe the set of beliefs that comprise a person's image of an organization or brand. It facilitates comparison of the images of the competing brands, stores and services. Respondents are asked to rate each attitude object in turn on a five or seven point rating scales, summated at each end of the two poles with adjectives or phrases.

6.5.5 Bogardus Scale

Bogardus carried out a systematic work for measuring social distance between national, ethnic, caste or other groups. It is made up of items with which respondents indicate agreement or disagreement The scale measures attitudes towards various types of groups. The respondent is asked to indicate the relation to which he would be willing to admit members of specific national groups. This attitude is measured by the closeness of relationship that he is willing to accept or the distance he would like to maintain. This is a rough uncontrolled scale which is however justified because it works.

6.5.6 Gutman's Scale

Locus Gutman's scaling is a critical alternative to Thurstone's and Lickert's method of attitude scaling. The procedure for constituting Gutman's scales and Bogardus scale is also known as "Scalogram analysis" or cumulative scaling. All reactions of a person are determined by one factor or dimension. In other words, endorsement of a given item must be accompanied by endorsement of all other items that are less extreme and rejection of all that are more extreme.

For example a cosmetic scale for women is analyzed as follows:

1. Face Powder 2. Cold cream, 3. Nail polish, 4. Lipstick and , 5. Perfume

A woman who uses the fifth item and she may also possess items 4, 3, 2 and 1. This is a Gutman scale.

Another example of the Gutman's scale is as follows. A man likes

1. Madurai city
2. South of Tami Nadu
3. Tamil Nadu
4. India
5. Asia.

These five characteristics represent a Gutman's scale. One who is characterized by item (1) is also characterized by items 2, 3, 4 and 5.

6.6 Sociometric Instruments

Sociometry has been defined as a "method for describing, and evaluating social status, structure, and development through meaning the extract of acceptance or rejection between individuals in groups" (Brofenbrenner, 1959) Another definition of sociometry is, it is a," method used for the discovery and manipulation of social configurations by measuring the attractions and repulsions between individuals in a group"

i. Principles Governing Sociometric Scales

1. Determining clearly what is to be measured and their conditions.
2. Careful selection of the elements or criterion to be used for rating or measurement.
3. According weight to each criteria with justification;
4. Constructing, as far as possible, a simple scale;
4. Applying a scale with a high degree of validity and reliability and consistency;
5. Applying an easily understandable scale which should also be quantifiable;
6. Applying a scale suitable under varying conditions.

Sociometric techniques have been extensively applied by the behavioral scientists like sociologists, psychologists and psychiatrists and criminologists in the study of group behavior, structure, social status and personality traits. Many researchers have proved the usefulness of sociometry as a research tool. It has been applied to study leadership, morale, social adjustment, social and communal relations, political relations, etc. In addition to these, Sociometry has also been applied in connection with psychiatric issues also. In short, it helps in understanding the individual's social relationship.

ii. Basic Techniques In Sociometry

Sociometric test is the basic technique, a test which is applied to assess the individual's relationship in a group in terms of one, liking or disliking of others in the group.

That is, both preferences and rejections are taken into account as indicators and are evaluated in the particular organizational feature of the group.

Sociometric choice depends on the choice of the people and influence of the minority groups. The choices also depend on the questions given to the individuals with regard to their preferences a rejections of other individuals in the group.

Three methods of sociometric analysis are made by social and sociological researchers, namely, a) Sociometric materials, b) Sociograms and c) Sociometric indices. Graphs are used for small and medium sized groups fro evaluating group relations. The criminality of an individual in the society depends on as per these criteria, the elements of attractions and repulsions of the society to individual members. In such the sociometry points to the fact that levels of criminality in a society is governed by social relations.

6.7 Steps in Developing Multi-Item Scale

Developing a multi-item scale is a complex procedure and requires quite a lot of technical expertise. The following are the steps in constructing a multi-item scale.

1. Determine clearly what is going to be measured.

The scale should be well grounded in theory. The construct to be measured and the scale itself should be specific. The meaning and definition of the construct should be clearly distinguishable from other constructs.

2.Statements that are relevant to the construct are known as items. They should be y generated as much as possible. The greater the number of initial items generated, the better the final scale will be.

2. The initial pool of items should be evaluated by experts who can review the items, confirm or invalidate the constructs. They may also add on the relevancy, clarity and conciseness of the items.

The items can be modified or dropped while others are added and a few others are changed.

4. The type of attitudinal scale such as Likert scale, Semantic differential scale, Thurstone and Associative scale to be employed should be determined.

5. In order to improve the scale's validity and to detect certain flaws in it certain statements are added. The statements to be added should be socially desirable.

6. After determining the construct related statements in the scale, it has to be administered to an initial sample to check the validity of the items. A large sample size representative of the population will yield better results.

7. The qualities that the statements of a scale should possess are high inter-correlation, high item scale correlation, and a mean close to the center of the range of possible scores. The statements on the scale are evaluated on the basis of these criteria.

The distinction between systematic error and random error is critical because of the way the validity of a measure is assessed. Validity is synonymous with accuracy or correctness. The validity of a measuring instrument is defined as the extent to which differences in scores on it reflect true differences among individuals on the characteristic we seek to measure, rather than constant or random errors. The researcher has the responsibility of evolving a measure in which the score he observes and records actually represents the true score of the object on the characteristic he is attempting to measure.

6.8. Direct Assessment

The relationship between measured score and true score is always inferred through.

1. Direct assessment employing validity.
2. Indirect assessment via reliability.

Normally, the true score of an object is inferred through the validity of the measure by looking for evidence of its pragmatic content construct validity and criterion validity.

i. Validity

For validity assessment of a scale there has been three basic approaches as follows:

1. Face or Consensus Validity
2. Criterion Validity
3. Construct Validity

1. Face or Content or Consensus Validity

When the measurement reflects or represents the various aspects of a phenomenon to a larger extent there will be more agreement on the acceptance of the same. In a market, buyers have faith in the advertisements and take them at their face value. The statements in the advertisements become valid by common consensus to ensure that a measure possesses consent validity in a matter of judgment.

2. Criterion of Validity

Criterion of validity is based on empirical evidence that the attitude, measures or correlates with other "criterion" variables. If the two variables are measured at the same time, concurrent validity is established. If the attitude measure can predict some future event, it is surmised that predictive validity has been established. Convergent validity is an attitude measure that can adequately represent a characteristic or variable if it correlates or converges with the other supposed measures of the variable.

3. Pragmatic Validity

Check Your Progress

5. How do you measure the relationship between the measured score and true score?

Pragmatic validity is determined strictly by correlation between the two measures. If the correlation is high, the measure is said to have pragmatic validity. Pragmatic validity is essay to assess and is an important kind of validity.

4. Discriminate Validity

Discriminate validity is identified through low correlations between the measure on hand and other measures that have not been taken up for measurement.

5. Construct Validity

Construct validity lies at the very center of the scientific progress for communication. The researcher has to ensure through plans and procedures used in constructing the instruments that he has

adequately sampled the domain of the construct and there is external consistency among the items of the domain.

The higher the correlation the better the items are measuring the same underlying construct. The constant validity of a measure is assessed by whether the measure confirms or denies the hypotheses predicted from the theory based on the constructs. The construct validity of a measure is established by relating it to a number of other constructs rather than simple one. It should also be measurable by several different methods which are independent of each other. Construct validity can be considered after only the discriminate and convergent validity have been established. Construct validity is established when a logical argument helps to define the concept and then to show the measurement or operational definition logically connects empirical phenomenon of the concept. Construct validity is not very much used in marketing measurements due to lack of well established measures that can be used in a variety of circumstances.

6.9. Indirect Assessment via Reliability

Reliability refers to the similarity of result provided by independent but comparable measures of the same object, trait or construct. It is distinguished from validity in that validity is represented in the agreement between two attempts to measure the same traits through maximally different methods and, reliability is the agreement between two efforts to measure the same trait through maximally similar methods. Reliability involves determining the consistency of independent or comparable measures of the same object, group or situation. The more reliable the measure, the lower is the random error in the equation of the observed scores. It is also seen that if the measure is valid it is reliable. If it is not reliable it can not be valid. That means, while lack of reliability provides negative evidence of the validity of a measure, the mere presence of reliability does not mean the measure is valid. Reliability is not a necessary but sufficient condition for validity. Reliability is more easily measured than validity.

Reliability though less important is easier to measure. Measures of reliability depend on the degree of stability and internal consistency of items in an attitudinal scale. Stability over time is assessed by repeating the measurement at two points of time and correlating the results. If random fluctuations result in different scores, the reliability is low. If attitude tests are conducted at very short intervals they will repeat similar attitudes. If it is too long, there may be fluctuations in their statements.

To overcome this problem split half method is taken up where these items can be divided into two equivalent sub-sets so that they can be compared for a measure of similarity. This is also known as equivalence method.

i. Stability

One of the more popular ways of establishing stability is to measure the same objects or individuals at two different points in time and to correlate the obtained scores. If the objects or individuals have not changed in the interim, the two scores should correlate perfectly. If they do not correlate to a certain extent, random disturbances were operating in either or both the test situations which produce random error in the measurement. This procedure is known as test reliability assessment.

The larger the scale, greater the reliability, but shorter scales are easier for the respondents to answer. Therefore, a balance has to be struck between gravity and reliability and the optimal scale length has to be determined. When certain statements in the scale are modified or dropped, the final scale is ready to be administered to the respondent.

ii. Sensitivity

The third characteristic of a good attitude measure is sensitivity. Sensitivity is the ability to discriminate among meaningful differences in attitude. Sensitivity is achieved by increasing the number of scale categories. However, larger the categories, lesser will be the reliability and enumerated amount of random fluctuations.

iii. Generalization

The generalization of a multi-item is determined by whether it can be applied in a wide variety of data collection modes, whether it can be used to obtain data from a wide variety of individuals and under the conditions, it can be interpreted. Generalization is not an absolute but rather is a matter of degree.

iv. Relevance

It is a scale measure that refers to how meaningful it is to apply the scale to measure a construct, mathematically it is represented as the product of reliability and validity.

Relevance = Reliability x validity. If either reliability or validity is low, the scale will possess little relevance. Both reliability and validity are necessary for scale relevance.

6.10 Measurement and Research

The various types of scales that are in use in domestic marketing research have been discussed in the previous pages of this Unit. These scales cannot be uniformly applied in research all over the world due to low educational or literacy levels in some countries as these two have a certain impact on the response for marks of the scales employed. Also culture in a country can affect the responses and may induce some cultural biases, in general, verbal scales are more effective among less educated respondents but scales with pictorial stimuli will be more appropriate procedure for illiterate respondents.

The semantic differential scale seems to come closer to being an uniform scale that can be applied in countries with various cultural environments. It consistency gives uniform results in terms of concepts or dimensions that are used to evaluate stimuli. It also accounts for major portion of variation in response when it is administered in different countries.

6.11 Summary

Scaling is the process of determining the quantitative measure of abstract concepts like leadership style, brand image of a product. A scale may be used to measure characteristics of a respondent or to evaluate an object presented to him.

There are five major approaches by which scales are developed. They are:

1. Arbitrary approach, Consensus approach, Items analysis approach Cumulative scale approach and Factor analysis approach. There are four types of measurement scales viz., Nominal scale, Ordinal scale and Interval scale and Ratio scale

Attitudes are the mental orientation of individuals regarding the way in which they respond to their environment. The various attitudinal scales are classified into single item scales and multiple item scales. These are also known as sociometric scales as they are concerned with social attitudes. Under the single item scales are viz., Itemized category scales, Rank order scales, Comparative scales, Constant sum scales, Q- Sort scales and Pictorial scales.

Opinion scales are methods of measuring the attitudes through the medium of opinions. Many forms of opinion scales are used in Psychology. They are viz.,Likert scale, Thurstone scale Semantic differential scale, Bogardus scale and Gutman's scale .

Sociometric techniques have been extensively applied by researchers as a research tool. Developing a multi-item scale is a complex procedure and requires quite a lot of technical expertise. The relationship between measured score and true score is always inferred through 1. Direct assessment employing validity, 2. Indirect assessment via reliability. For validity assessment of a scale there are basic approaches viz., reliability, stability, sensitivity, generalizability and relevancy. The scales can not be uniformly applied in research all over the world due to low educational or literacy levels in some countries as these two have a certain impact on the response for marks of the scales employed. The semantic differential scale seems to come closer to being an uniform scale that can be applied in countries with various cultural environments.

6.12 Key Words

Measurement	It is a standardized process of assigning numbers or other symbols to certain characteristics of the object according to some prescribed rules.
Scale	Scaling is the process of determining the quantitative measure of abstract concepts. product
Societal Measurement Scales	Sociometric Study
Attitude Measurement	Attitudes are the mental orientation scales of individuals regarding the way in which they respond to their environment
Multiple Item Scale	A method to measure a sample of beliefs toward the attitude object and combine the set of answers into some form of average score.
Reliability	It refers to the similarity of result provided by independent but comparable measures of the same object, trait or construct. Stability measuring the same objects or individuals at two different points in time and to correlate the obtained scores.
Sensitivity	It is the ability to discriminate among meaningful differences in attitude
Generalization	Determination of a multi-item is determined by whether it can be applied in a wide variety of data collection modes and interpreted

Relevance	It is a scale measure that refers to how meaningful it is to apply the scale to measure a construct,

6.13 References

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6.14 Answers to Check Your Progress

Question No.	Section No.
1	6.1
2	6.3
3	6.5
4.	6.5.2
5.	6.9

6.15 Model Questions

1. Explain the concept of measurement and scaling techniques.
2. Study the development in scaling approaches.
3. Describe any two of the attitude scale techniques related to people.
4. Discuss the Likert Scale of measurement.
5. Examine the Bogardus Scale measurement technique.

Lesson-7

Sampling Methods And Longititudinal Studies

Introduction

An important concern of a research is sampling of the respondents. In certain type of studies, the whole population in an area could be included for the studies. For example, 9n extensive case study of a small village consisting of fifty households could cover the households. It is possible for the researcher to meet a each member of every household and interview them for collection of data. Analysis is also manageable. This method is called census method of data collection. But including everyone for the study is not possible always. There is need to collect information from a portion of the population called samples. In this Unit, longitudinal studies which relate to social, sociological and criminological phenomenon over a long period are also discussed.

Objectives

The following aspects of Sampling Method are discussed in this Unit.

The Laws of Sampling Research
Steps in the Sampling Procedure
Types of Sampling Method
Sampling and Non-Sampling Errors and
Advantages and Limitations of Sampling
The Causes for Delinquency
Time Series Research
Operation of Sample Research on Observation Method and
The Reliability and Validity of Longitudinal Research

Unit Structure

7.1 Definition

The main objective of any sampling procedure is to secure a sample, which, subject to limitation of size, will reproduce the characteristics of the population as closely as possible. Goode and Hatt define sample as a smaller representation of larger whole. Nan Lin defines it as a subset of cases from the population chosen to represent it. By using the characteristics of the subset we can infer the qualities of the population.

Sampling can derive the statistical image of the population. No particular method of sampling can be considered to be the best because suitable sampling technique is evolved according to the nature of the population and design of the study. The important factor to remember in sampling procedure is that the sample must be representative; that is, the sample must represent all the qualities and variations that exist in the population. The term 'population or universe used in the

statistical parlance is constituted of all individuals, things, events or documents or observation on a single or many individuals etc. Conforming to designed set of specifications which should principally be covered by a particular study.

The process of selecting a sample is called sampling technique. There are various methods of selecting samples. The choice of any one particular method depends upon.

1. The nature of the problem under study or consideration.
2. The nature of the population or universe from which sample is to be drawn.
3. The uses for which the results are obtained from the sample study.

7.2 Laws of Sampling Research

There are two important principles upon which the theory of sampling is based. In other words, the validity of the sampling or the whole of the theory of sampling is based on two general laws.

1. The law or the principle of statistical regularity.
2. The law or the principle of inertia of larger numbers.

Check Your Progress

1. Explain the Sampling Research Technique.

1. The Law Or The Principle Of Statistical Regularity

It states that a reasonably large number of items selected at random from a large group or items will be the average representative of the characteristics of the large group or population.

2. The Law or The Principle Of Inertia of Large Number

It is a corollary of the previous law and it states that large groups or aggregate of data show a higher degree of stability than smaller ones. In other words, the movements of all the separate components of the aggregate reveal a tendency to compensate one another, some probably moving higher and others lower. It should be noted that they are merely two principles and not laws. But, there are the tendencies, which operate universally and appropriate for to short periods only.

7.3 Steps in the Sampling Procedure

The process of selecting the sample or sampling consists of several steps or procedure. They are as follows:

1. Defining the population or universe
2. Specifying the frame of sampling
3. Specifying sampling unit
4. Specifying method of sampling
5. Determining the size of sample
6. Deciding the plan for selecting the sampling units.
7. Actual selection of sample.

7.4 Types of Sampling

Sampling method can be broadly divided into two types.

1. Probability Sampling or Random Sampling

Probability sampling is used when the investigator is not sure of the characters of the population and does not have enough information. He could only guess. In probability sampling each element or unit in the population has equal chance of being included in the sample. The main advantage of this method is the complete absence of human bias in picking units from the population. The probability sampling is made on the basis of a) the type of the population b) characteristics of the units of the population and c) objectives of the survey. Since the sample is selected only on probability basis, the sample is unbiased, consistent, efficient and sufficient. The major forms of probability sampling are discussed below:

Check Your Progress

2. What are the stages in sampling technique?

a. Simple Random Sampling

A simple random sample is selected from the population (universe) by a process that gives each element an equal chance of being included in the sample. It also makes every possible combination of the elements available. The actual mechanism of selection of units into the sample is called the sampling scheme. Various schemes are used to make simple random sampling. There are two mechanisms of sampling scheme. In one method the unit once selected is put aside and will not be duplicated. In another scheme, the unit first chosen may repeat again. One method is Lottery method in which each member of the universe is assigned a number. Each

number is written on a paper and put in a basket or bowl. Then a blindfolded person is asked to pick up a number. There is another method of selecting the sample randomly by random numbers, when the sample is large and sampling is not possible. Then a technique of selecting with the help of numbers already prepared mathematically may be used. These numbers are standard ones and are derived by mathematical calculations. Some random numbers are 61, 44, 65, 0, 59, 96, 26, and 67.

b. Restricted Random Sampling

The unrestricted random samples involve much expense and time. Moreover the unrestricted random sampling cannot be adopted when the population is relatively larger in size. So, a restricted random sample is used in order to increase the efficiency of sampling technique. The following are the two methods of restricted random sample.

i. Stratified sampling

ii.Cluster sampling

i. Stratified Random Sampling

Stratified random sampling is the one in which, the population is first divided into a number of strata based on a single criterion like sex or profession (or any other variable). Then a simple random sample is taken from each stratum. Such sub samples are brought together to form the total sample. What criterion, the researcher is going to use depends on the type of analysis he wants to do for the study. Under this random sampling method each and every item of the population of the universe has an equal and independent chance of being included in the sample. The underlying feature of a random sample is that the personal factor is eliminated in the selection of the sample, as the investigator does not exercise his discretion in the choice of items. No factor other than pure chance affects the likelihood of an item being included in or excluded from the sample.

So, this method is also known as the method of chance selection. This method is also called as a probable sample as each item

Check Your Progress

3. Describe Random Sampling Method

has equal opportunity or probability or chance of being selected. However this method is suitable for a small homogeneous population.

ii. Allocation of Stratified Sampling

After stratification of the universe or population it is necessary to decide upon the number of items to be drawn from each stratum. The procedure employed in determining the number of items to be drawn from each stratum is called allocation. The allocation of stratified sampling may be proportional or disproportional to the size of the stratum.

In a proportional stratified random sampling plan, the number of items drawn from each stratum is proportional to the size of the strata. On the other hand if an equal number of units are drawn from each stratum, regardless of the total size of the stratum, then it is known as disproportionate stratified random sampling. In the case of proportionate allocation of sample, the total sample would properly represent all the strata which would in turn eliminate the differences between strata end thus reduces the sampling error.

iii. Cluster Sampling or Multi-stage Sampling

Under this method the population or universe is divided into clusters or large groups, which will form the basis for primary sampling units. After forming these clusters, a few sample clusters will be selected by unrestricted random sampling method. These selected clusters are called as primary sampling units. There may be a number of items in each of the primary sampling units. Now, it may be possible to investigate each and every elementary sampling unit in selected cluster or it may be possible to draw an unrestricted random sample of elementary sample unit from each selected cluster. It is often found that the clusters formed on a geographical basis are of great practical importance.

In a cluster sampling the universe is divided into groups or clusters in such a way that, a. There is as much heterogeneity as possible within each cluster, b. There is only small difference between the clusters.

Thus it is generally held that a cluster sample is considerably less expensive than unrestricted random sample. It saves lot of time

also, again lack of complete and up to date list of elementary sampling units makes the task very difficult and some times impossible to use unrestricted random sample. Under such situations, it is only the cluster sampling method can be best suited to the situation. However, it is considered that cluster sampling method gives less accurate results compared to other methods of sampling.

In cluster sampling, the researcher first takes samples from the population from certain large groupings. These clusters may be city wards, households, or any geographical or social unit. Sampling from the cluster is made by simple or stratified sampling method. For example, in a study relating to the benefits of Governments scheme to the depressed castes, the samples may be selected from different depressed caste groups. Here, the cluster is 'caste'. The advantages of cluster sample are it is economical and time saving. One disadvantage of cluster sampling is 'that the cluster' may be of unequal size.

Multi-Stage Sampling

It is sometimes convenient to confine certain questions about details to a fraction of the sample while other information is collected from the whole sample. This procedure is known as multi-stage sample. This also facilitates stratification of sub-samples.

2. Non-Random or Non-Probability Sampling

The most important characteristic of the non-probability sampling is that the sampling procedure adopted in this design does not afford any basis of estimating the probability that each element in the population has the opportunity of being included in the sample. Every element has some specifiable chance of being included in the sample. The important forms of non-probability sampling are,

a. Accidental Sampling

B. Quota Sampling

C. Purposive Or Judgment Sampling

A. Accidental Sampling / Incidental Sampling

In this method, the investigator simply contacts and picks up cases which become a cross section and thus continuing the process till the total sample reaches a designated size.

This method of sampling is economical and convenient and can also afford a basis for stimulating insights and hypothesis. Similarly, the accidental sampling is also useful in those cases of study where too much accuracy is not needed. Quick surveys on public opinion adopt this method. The sample may not be representative.

B. Quota Sampling

Quota sampling is a type of stratified judgment sampling. The basic objective of quota sampling is the selection of a sample that is the miniature of the universe. The steps of quota sampling are;

a. Classifying the population in terms of certain qualities or properties

b. The proportion of samples falling into each category decided

c. The investigator assigns a quota of respondents on the basis of his judgment.

The advantages are:

1. Varying amounts of latitude are possible for analysis
2. Less cost
3. Easier to adopt and estimates may be made quickly. It has limited precision bias and inaccuracy.

c. Purposive or Judgment Sampling

In this method, the sample items are selected in accordance with some purposive principles or in accordance with some one's personal judgment. However, the chance of inclusion of some item of the population in the sample is very high and very low for others. Similarly, the bias of the investigator can play a very important role and sometimes even destroy the representatives of the sample. But there are cases where purposive sampling can always give better and accurate results. The purposive sampling is suitable when the universe consists of only a small number of sampling units and in solving everyday business problems.

Check Your Progress

4. Discuss the procedure for conducting snow ball sampling.

d. Snow Ball Sampling

This refers to taking the samples from the populations of various sizes in increasing order. For example, if there are five accident zones on a highway, these-zones may be arranged in the order of less serious, serious, very serious, very serious and extremely

serious. Then, samples of accidents in these five zones must be in the order of 5, 10, 15, 20, 25 respectively.

7.5 Sample Size

If a larger sample than what is required in chosen, it may involve more cost and time. If a small sample is chosen the results obtained will be relatively less accurate. So the size of sample must be optimum in nature. An optimum sample may be defined as that size of sample, which fulfills the requirements of efficiency, representativeness, reliability, and flexibility. However, the actual size of the sample depends on the following factors.

i. The Nature of Population

If the composition of the survey population is more homogeneous in nature, the survey will yield reliable results.

Ii. Complexity of Tabulation

The size of the sample also depends upon the number of categories and classes into which the findings are to be grouped and analyzed. If these categories are greater in number, large size of the sample may be needed to yield reliable statistical results. The size of sample chosen should be large enough to give adequate and reliable measure of the smallest important categories of data or information.

iii. Problems Relating to Collection of Data

The size of the sample must be such that the data can be secured with given funds and time. The volume of data is affected by the length of the questionnaire or schedule, the number of field workers, the concentration of cases in a geographical area, the refusal rate, the losses of cases, the type of sampling method employed and the method of data collection.

It is generally considered that a smaller sample will be sufficient when stratification is employed in the sampling technique. The stratified sampling requires only fewer cases compared to simple random sample because the sample into each stratum needs to be representative of that stratum and not of the entire universe or survey population.

iv. **Margin of Error or Limit of Accuracy**

The researcher may have to decide about the tolerable limit of error in the estimate of sample compared to the true value that Is, margin of error or limits of accuracy. The researcher may tolerate the margin of error to 5% or 2% depending upon the degree of accuracy required in the study. It should also be noted that the standard error gets smaller as the sample becomes larger in size.

Mildred Patten has given the following formula for calculating sampling size.

Sample size = SZ /T

Where S stands for the preliminarily standard deviation of the universe.

Z stands for the number of standard error units. T stands for the margin of error to be tolerated.

7.6 Sampling And Non-Sampling Errors

In a sample survey, only a small proportion of the entire universe or population is studied and thus inferences are made about the entire universe or population. So there is always likely to be a certain amount of inaccuracy or errors in such inferences. Such errors are known as sampling errors or sampling fluctuations. Such sampling errors are not likely to be there in a census survey. The errors are;

Check Your Progress

5. Define biased error.

1. Biased errors
2. Unbiased errors.

i.. Biased errors

These are the errors, which arise on account of the bias or prejudices of the person in selecting a particular method of sampling.

ii. Unbiased Errors

These are the errors, which arise due to chance differences between the members of the population included in the sample and those not included. It is also known as random sampling errors. This type of error decreases on an average as the size of the sample increases. Hence, the unbiased errors are otherwise called as non-cumulative or compensating error.

The bias in the surveys may arise on account of the faulty process of selection of sample, faulty work during the collection of information and family method of analysis.

7.7 Non-Sampling Errors

These errors can occur both in census and sample surveys. It includes the biases, prejudices and other related mistakes, which arise in conducting the survey. The non-sampling errors tend to increase with the sample size. The factors responsible for the non-sampling errors include the vague definition of population, vague questionnaire, vague conception regarding the information desired, inaccurate or in appropriate methods of interview, observation or measurement of errors in data processing operations and errors committed during presentation and printing of tabulated results.

7.9 Advantages Of Sampling

The sampling technique is widely used in survey method of data collection. The following are the advantages of Sampling technique.

1. When there is a large population or universe, sampling technique is best suited for the collection of data as it economizes money, time and effort.
2. A higher percentage, of accuracy can be ensured only through sampling survey.
3. The sample technique enables the investigators to collect the required information from relatively a large size of population or the availability of data as unlimited in character.
4. There are certain types of study where the census method cannot be adopted at all. Sampling method is to be necessarily followed to make an attempt to evaluate in such cases.
5. When the items of a universe or population are more homogeneous in nature, sampling technique is more feasible and useful.

7.9 Limitations of Sampling

1. When the various units of the survey population are not alike and liable to change frequently, the conclusions derived from one gset of units are not comparable with another set of units.

2. If due care is not taken in conducting a sample survey through a proper selection of sample units, the conclusions will be much misleading and erroneous in nature.

7.10 Longitudinal Studies

Longitudinal studies refer to the study of certain social, sociological or criminological phenomenon over a very long period. The term long period needs to be understood in this connection only with reference to the nature of the data collected for study, in order to see the trend in the data collected. This is based on the fact that many interactive changes, influenced by forces of divergence and forces of convergence are bound to occur in the long period exerting an impact on sociological or criminological trends.

Check Your Progress- II

1. What are the Types of longitudinal measurements?

Hirchi in his book entitled, Causes of Delinquency (1969) has made a threefold classification of longitudinal studies. They are;

1.Trend Study : In this, number of years are taken into study to find out the trend with regard to certain important variables, such as, drug addiction, crimes, juvenile delinquency, accidents etc. Measures such as time series analysis and trend analysis fall under this category. Such kind of study is normally used for comparing data across time intervals on different subjects. Trend study offers strong evidences of changing trends.

Check Your Progress- II

2. What is Cohort research study?

2. Cohort Study :

Cohort is a group of persons born within the same period, who may be called of the same generation. For example, babies born during the Great Depression of 1930s may be called 'Depression era babies'. Similarly, we can call a group 'war generation' with reference to World War II etc. Such cohorts are usually studied during a future period. And. *one* cohort group may be compared with earlier cohorts or later cohorts. Qualities of age group and other characteristics may be compared between two or three different cohort groups.

3. Panel Study

Panel study refers to studying the characteristics of same group of people at two different points of time, by asking the same

questions, in order to see the impact of some events and developments which might have taken place in between the two points of time.

7.11 Time Series

Social sciences like criminology make very extensive use of time series analysis. Time series is a set of quantitative readings of some variable recorded at equal intervals over a pretty long period. Time series indicate the trend with regard to the movement of certain variables over a period of time. For example, daily collections in a cinema theatre for three months, monthly production figures of an industry during one year period. Similarly, on the criminological side, time series may be constructed for month wise burglary in a city or district over a year or two. There may be a large variety of forces behind a time series, occurring with regular intervals or irregular intervals. Such forces are of four categories. They are,

a. Secular Trend

b. Seasonal variation

c. Cyclical fluctuations

d. Irregular, erratic or random fluctuations

Check Your Progress - III

3. Explain Time Series Research Study

7.12 Classic and Quasi -Experimental Study

Generally, most of the social sciences including criminology have their own classical theories. The classical theories are very much descriptive and are inductive in nature. They are not experimental but based on observation. However, after the middle age, criminologists like Lombroso brought out theories based on experiment as well as observation. Such studies are known as quasi-experimental theories. Later, in the 20th century field - oriented empirical analyses became very common in social sciences Including criminology. This led to extensive data collection, their classification and scientific analysis. Now most of the criminological researches are empirical and the descriptive part is very much minimized.

7.13 Master Samples

Master samples refer to a big chunk of a period taken out of very long period such as 20 or 30 years. Generally, in social research, when a long period is taken up for a study, a few very important

variables only shall be included for study. It is neither possible nor advisable to include many variables in a very long period of study. The study may become quite unwieldy. For example, if one attempts to study all kinds of crimes during 50 years after Independence, the study may become quite unwieldy and data constraints may develop. On the other hand, one may study one particular type of offence over a long period. For example, one may take up the study of trends in juvenile offences during the 50 years since Independence.

If an in depth study is to be made regarding the trends in juvenile offences, then a sample of 10 years out of 50 years may be taken as a master sample. Such master sample period should reflect a change in the trend following certain policies with regard to the juveniles, such as the age declared for the juvenile offenders, policy of the juvenile reform schools, or policy about juvenile rehabilitation etc. Such master sample should be comparable before and after.

7.14 Sampling Techniques Used In Observation

As it has been stated earlier, observation is one of the basic methods of getting information. Scientific observation is based on a research purpose, with a planning, and with checks and controls on validity and reliability. For example, a researcher who wants to study the trends in crime situation for one year in the current period in a particular city or a district with the aim of finding out the causal factors, needs to make an observation on the basis of the prominence of the Leo situation in positive terms or negative terms. This involves time sampling, event sampling and situation sampling.

Check Your Progress-IV

4. Describe the master sample research..

i. Time Sampling

Time sampling refers to making observation of the crime trend during particular times or periods. For example, festival periods normally witness sudden spurt in crimes, if adequate preventive measures are not taken by the police. Event sampling on the other hand, refers to taking particular events as samples and drawing inferences, with futuristic visions. Situation sampling denotes, taking samples of particular situations, making an in-depth study of the samples in order to draw inferences. The master sampling taken from a

Check Your Progress-V

5. Discuss Time Sampling research.

long period is expected to be the source for time sampling, event sampling and situation sampling.

7.15 Reliability And Validity Of Longitudinal Studies

Reliability and validity are the two most basic qualities of any useful research. These two qualities are derived from the data and other relevant information collected from various sources for the study. Pauline V Young states, "In developing a sociometric scale, it is very important to test both its reliability and validity".

i. Reliability

A researcher engaged in longitudinal studies or secular trend analysis, will have to use only those facts and figures which are reliable, and discard all other details. This implies consistency of the data. That is the scale which is applied must "agree with itself". In fact, any research project must have consistency from A to Z of the project. This implies, the objectives of the project, data

collected, hypotheses, data analysis and results of the study all must be consistent with each other. This is more so in the long term study than a short- term study, because in all the data relating to the distant past, consistency may not be so much visible.

ii. Validity

Validity of a study is another important requirement of a research project. This means the study is expected to have a moderate predictive power. The scale which is applied must fit in with the data and information collected for the study. For example, along with random sample survey, a scatter diagram may be used to show the trend with regard to public perceptions of crime trends in different parts of a city.

7.16 Summary

Goode and Hatt define sample as a smaller representation of larger whole. No particular method of Sampling can be considered to be the best because suitable sampling technique is evolved according to the nature of the population and design of the study. The important factor to remember in sampling procedure is that the sample must be representative . Laws of Sampling Research are 1. The law or the

principle of statistical regularity and 2. The law or the principle of inertia of larger numbers. The process of selecting the sample or sampling consists of several steps or procedure. Sampling method can be broadly divided into two types.

1. Probability Sampling Or Random Sampling. The two methods of restricted random sample are i. Stratified sampling and ii.Cluster sampling. The important forms of non-probability sampling are, a. Accidental sampling, b. Quota sampling, c. Purposive or Judgment Sampling, a. Accidental sampling / Incidental Sampling.

The actual size of the sample depends on the following factors. i. The Nature Of Population, , ii. Complexity Of Tabulation, iii. Problems Relating To Collection Of Data and iv. Margin of Error or Limit of Accuracy. Mildred Patten has given the following formula for calculating sampling size.

Sample size = SZ /T

Where

S stands for the preliminarily standard deviation of the universe.

Z stands for the number of standard error units. T stands for the margin of error to be tolerated. There is always likely to be a certain amount of inaccuracy or errors in such inferences. Such errors are known as sampling errors or sampling fluctuations. The errors are;

1.Biased errors

2.Unbiased errors.

Check Your Progress- II

2. What is Cohort research study?

Non-Sampling Errors can occur both in census and sample surveys. It includes the biases, prejudices and other related mistakes, which arise in conducting the survey. There are advantages and disadvantages in the sampling method.

Longitudinal studies refer to the study of certain social, sociological or criminological phenomenon over a very long period. Hirchi in his book entitled, Causes of Delinquency (1969) has made a three fold classification of longitudinal studies. They are; 1.Trend Study, 2.Cohort Study and 3. Panel Study .

Time series is a set of quantitative readings of some variable recorded at equal intervals over a pretty long period. Time series indicate the trend with regard to the movement of certain variables over a period of time. For example, daily collections in a cinema theatre for three months, monthly production figures of an industry during one year period. Similarly, on the criminological side, time series may be constructed for month wise burglary in a city or district over a year or two. There may be a large variety of forces behind a time series, occurring with regular intervals or irregular intervals. Such forces are of four categories. They are,

a. Secular Trend
b. Seasonal variation
c. Cyclical fluctuations
d. Irregular, erratic or random fluctuations

Criminologists like Lombroso brought out theories based on experiment as well as observation. Such studies are known as classic quasi-experimental theories. Master samples refer to a big chunk of a period taken out of very long period such as 20 or 30 years. Time sampling refers to making observation of the crime trend during particular times or periods. Reliability and validity are the two most basic qualities of any useful research.

7.17 Key Words

Population	It is constituted of all individuals, things, events or documents or observation on a single or many individuals etc.
Sampling Technique	The process of selecting a sample
Stratified random sampling	The population is first divided into a number of strata based on a single criterion.
Snow Ball Sampling	Taking the samples from the population of various sizes in increasing order

Biased errors	They arise on account of the bias or prejudices of the person in selecting a particular method of sampling.
Unbiased Errors	These arise due to chance differences between the members of the population included in the sample and those not included
Delinquency	Crime committed by children below the age of 14.
Cohort	People belonging to the same generation.
Time Series	A set of quantitative readings of some variables for a long time at equal intervals
Master Sample	Considering a large portion of data for research.
Time Sampling	Taking up research on crimed data at particular time intervals

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Answers to Check Your Progress

I-Question No.	Section No.
1	7.1
2	7.3
3	7.4
4	7.4
5	7.6
II- 1	7.10
2	7.10
3	7.11
4	7.12
5	7.13

Model Questions

1. Explain the laws of sampling technique.
2. Explain the stratified sampling technique
3. Analyze the factors on which the size of the sample rests.
4. Discuss the errors in sampling technique.
5. Trace the drawbacks in sampling technique.
6. Explain trend analysis.
7. Describe group research.
8. Discuss the classical or quasi experimental research.
9. Examine the time Sample Research
0. Account for the reliability and validity aspects of longitudinal research.

Lesson -8

Data Analysis and Interpretation

Introduction

Data processing, analysis and interpretation form an important part in the research domain. For a good scientific data analysis, data processing is necessary. In this Unit salient features of data processing, analysis and interpretation are explained.

Objectives

The important aspects of data processing, analysis and interpretation are stated below

Data Processing

Classification of Data

Tabulation of Data

Data Analysis and Interpretation and

Generalization of Data

Unit Structure

8.1 Processing of Data

John Galtung differentiates data processing from data analysis. Processing of data refers to consolidation, recasting or regrouping of data so that it is amenable to analysis. Analysis of data refers to seeing the data in the light of the hypothesis or objectives and the prevailing theories, and drawing conclusions. Data analysis depends on the nature of data-whether it is quantitative or qualitative. If the data is collected for a specific objective, then processing becomes easier. But, for studies with broad titles and the data collected with vague clues, then analysis becomes difficult. Many researchers think of data processing only after the study is complete. But, actually processing of data is an integral part of the research design. If the data collected are simple and limited, the processing may be done manually. If it is large and complex, trained staffer, computers may be used. The use of computer will save time. But the financial cost may go up. The following are the stages in data processing.

i. Editing
ii. Coding
iii. Tabulation

i. Editing

Editing refers to the checking of filled in questionnaire, for completeness and accuracy. This will avoid distortion and error that might take place. Even if the researcher is an expert, certain gaps are bound to occur in the questionnaires. Editing begins in the field itself. Soon after finishing the interview, the investigator must check the questionnaire immediately. Information, he finds to be missing must be collected soon by re-interview. After the whole data is collected, he is expected to recheck the questionnaire for completeness. The scrutiny of interview schedule centers around three main aspects.

Check Your Progress

1. Explain the editing process.

a. The Completeness

That is, the researcher has to find out whether all the questions in the schedule are answered. Due to the reluctance on the part of the respondent or the eagerness to complete the work quickly on the part of the researcher, he might leave some questions unanswered, it is a costly attempt to visit, the field again to collect the missing information and hence, checking must by done after every interview is over. Under inevitable circumstances, he has to go to the field and fill it up. Gaps might also occur due to the impatient writing or hasty writing of the interviewer.

b. Inconsistency

Sometimes the respondents do not, get the correct meaning of the stimuli and respond to it. The response may be inconsistent or erroneous. By checking the questionnaire immediately, the researcher could improve the data from inconsistency.

c. Regularity

Regularity mainly refers to the method of asking questions by the interviewer and method of recording them. Irregularities occur due to lack of objectivity in the analysis. Bias in asking the questions must be avoided.

ii. Coding

Check Your Progress

2. What is coding?

Next step to editing is 'coding' of data. Coding is "converting the qualitative data in the questionnaire to numerical form and presenting it on the coding matrix. This process reduces the huge quantity of data to manageable proportion and makes it feasible to further process more systematically and rapidly. The purpose of coding is to classify the answers into meaningful categories. Allocation of individual's response to categories can be done in three ways (1) by the interviewer in the field while getting the response itself, (2) by the respondent when the questionnaire offers specific alternatives and (3) by the coders employed for this purpose. The coder should take proper training. The quality of coding depends on the care with which the initial stages of schedule preparation are done. Code sheet is the document on which all the information relating to coding is

consolidated. This must be maintained safely as it will be required for reference at any stage of analysis and interpretation.

The analysis of data involves a number of stages. At each stage great care must be taken so that interpretation becomes easier an accurate. The following is the proeedure of analysis.

a. Establishment of Categories

Establishment of categories means classification of data. After data collection, the investigator finds the response sheets filled with different types of responses to the stimuli. He has to organise the responses so that it becomes meaningful to find out an answer to the research question. In order to draw generalizations, the data must be grouped into a limited number of categories. For example, there is a question like. Do you like the new education policy of the Government? For which the categories can be (1) 'Yes' (2) 'No' and (3) No idea. Therefore, this stimulus has three categories. He must able to establish appropriate principles of classification that would include all the possible answers and also presents a data meaningfully.

The categories established for single stimuli are referred to as a 'category-set'. It must fulfill three requirements.

a. The category set must be exhaustive. For example, particulars regarding marital status should be classified under married/unmarried or widowed / separated, which will cover all the respondents under marital status.

b. The category set must be derived from a single classificatory principle. More than one principle should not be included. For instance, a detail should not have Forward class/Backward class/Scheduled caste/ Hindu. This is wrong because it in eludes caste and religion.

c. Thirdly, a category should not overlap. Thus, no response should be claimed more than one category within the set. Establishing categories is easy only if the responses are simple and clear cut.

b. Coding and Editing

Editing involves careful scrutiny of data for completeness, comprehensibility, relevance, uniformity, legibility and consistency.

8.2 Classification

Classification means grouping of related facts to classes. It is similar to sorting letters in post offices or sorting out applications for admission. Based on the objectives and or hypotheses, logical and mutually exclusive categories have to be identified for tabulation of the data. Classification has the following objectives:

i. To condense the mass of data in order to note similarities and dissimilarities.

ii. To facilitate comparison.

iii.To pinpoint the most significant data at a glance.

iv.To give prominence to important information and drop out unnecessary elements.

v.To enable a statistical treatment to the material collected.

8.3 Types Of Classification

Data may be classified according to geography, chronology, quantity and quality and class interval. Let us see them one by one.

i) Geographical Classification

Area wise classification is known as geographical classification.

ii. Chronological Classification

When the data are classified on the basis of time it is known as chronological classification.

iii. Quantitative Classification

Check Your Progress

3. Describe classification of data

Quantitative classification refers to classification made in terms of magnitude or according to certain attributes, which can be measured.

iv. Qualitative Classification

When the data are classified according to some attributes such as sex, color of hair, literacy, religion, it is known as qualitative classification.

v. Classification According To Class Intervals

This is the most popular classification in practice. In a classification made according to class intervals three things are noteworthy. They are class limit, class interval and class frequency.

I. Class Limits

Class limits refer to the lowest and the highest values that can be included in the class.

ii. Class Interval

Class interval refers to the span of a class

iii. Class Frequency

Class frequency refers to the number of observations corresponding to a particular class. There are a few principles to be borne in mind while preparing the classification based on class intervals. They are:

i. It is better if the number of classes is 6 to 15. the number of classes should depend upon;

a. Number of figures to be classified the magnitude of figures the details required

b. The case of calculation of further statistical work.

ii. Odd values of class intervals such as 3, 7, and 11 should be avoided.

iii. Exclusive method ensures continuity and correct class interval. The interval should be equal for all classes.

iv. The starting point be 0 or 5 or multiple of 5

v. Size of items or the values should be indicated on the left hand side and numbers of times the items have been repeated in those size or values are indicated by frequencies on the right hand side.

8.4 Characteristics of Good Classification

1. When the units are divided into various classes, the classes are made clear-cut and there's no overlapping. Every unit and group must find a place in some class or other and no unit can be placed in more than one class. For example when the population of India is classified into Hindus, Muslims and Christians, Buddhists can't find a place in any one of these groups.

2. The basis for classification of units into a group is this respective homogeneity.

3. A perfect classification of groups contains the same basis of classification through the analysis.

4. The total number of units in different classes should be equal to the total numbers of groups in the universe this can be achieved when all the units are placed in one group or other and there has been no duplication of the units.

5. Classification should be according to the purpose of enquiry. For example, the intelligence of the two groups of students are tested, they shouldn't be classified according to their religion, as religion isn't a proper indicator of intelligence of a person.

8.5 Tabulation

After editing and coding is complete, the data must be put together in some kind of table. Tabulation can be done manually or by computers. Computer tabulation offers all possible combinations of cross tabulations. One can prefer to go for machine tabulation if the data is vast on a large sample. Machine tabulation is vast but expensive.

A table is an exhibit of numerical data systematically arranged in labeled columns. The table should have the number. The title/caption of the table is an essential feature, which tells the reader what it is about.

Check Your Progress

4. Describe various kinds of tabulation

Each column should indicate the variable it explains. The preparation of the tabje should follow certain principles.

1. The units entered in the left hand column describing the qualities or values must be mutually exclusive as well as inclusive.
2. The table should have internal logic and order.
3. If the left hand column is a quantitative variable, such as years of experience, the class intervals must be carefully and reasonable chosen.

Classification and tabulation go hand in hand. Presentation of data in table is tabulation. It plays very important role in the analysis of data. It has the following advantages,

1. It simplifies the complex data
2. Repetition of data is avoided
3. It saves time, space and money
4. It facilitates comparison

5. It gives an identity to the data

6. It forms patterns.

The following are the chief parts of the Table shown in the model.

Table

Distribution of Poverty and Literacy in Districts A and B

Item	District A	District B
Total population	9,00,000	1,10,000
No. of poor people	70,000	90,000
No. of literates	3,00,000	3,00,000
No. of poor literates	2,00,000	2,50,000

Source : 1991 Census 7

1. Table Number

Table number is given at the center top/bottom center.

2. Title

It refers to the description of the contents of the table. In the example given above "Distribution of poverty and literacy in Districts A and B" is the little given. It is concerned with what and where and when. The title should be brief and explanatory.

3. Caption

It refers to the column heading. There are three columns in the example, items, District A and District B are the three captions used in the given example.

4. Stub

It refers to the designation of the rows or row headings. In the example there are four rows. Total population, number of poor people. number of literates and number of poor literates are the stubs in the given example.

5. Body

Body refers to that part of the table, which contains the numerical information. The number of people indicated under each item refers to the body of the table.

6. Head Note

It refers to the explanatory note. (Tone, kilogram, million, rupees etc. in terms of which the numerical information is expressed refers to head note).

7. Foot Notes

It refers to the source in case of secondary data, to clarify anything in the table, to point out any exception, in the given example the source is indicated at the bottom of the table.

i. General Rules for Tabulation

The following are the general rules for preparing the tables.

i. Tables should suit the size of the paper

ii. It should be systematically (geographically or chronological) arranged.

iii. Figures should be rounded up with proper footnote explaining it.

iv. Better not to use abbreviations or ditto marks.

8.6 Types of Tables

There are three types of tables generally prepared. They are simple or one-way table two-way table, and higher order table.

i. Simple / One way Table

In this type of table only one characteristic is shown.

ii.Two way Table

In two-way table, two characteristics are shown.

iii. Higher order Table

In this type of table three or more characteristics are shown.

8.7 Analysis Of Data

With regard to statistical application there are two types of analysis. One is descriptive analysis and the other is inferential anlaysis. Descriptive analysis limits generalization to the particular group of individuals observed. No conclusions are extended beyond this group and any similarity to those outside the group cannot be assumed. The data describes one group and that group only.

Inferential analysis always involves the process of sampling, and the selection of a small group drawn from a larger group. The small group is known as sample; the larger group the population. In

inferential analysis observations are made of the samples and based upon observations and conclusions are drawn about populations.

It involves studying the tabulated material in order to determine their inherent facts or meanings. It involves breaking down existing complex factors into simpler parts and putting the parts together in a new arrangement for the purpose of interpretation. A preliminary analysis of the skeleton plan should be developed into a complete final analysis enlarged and re-worked as and when necessary. Larger divisions of material should be broken down into smaller units and re-arranged in new combinations to discover new factors and relationship. Data should be studied from as many angies as possible to find out new and newer facts.

The following are the four methods to start with analysis of data.

1. To think in terms of significant tables that is possible from the data.
2. To examine carefully the statement of problem and earlier analysis and to study the original records of the data.
3. To think about the problem in layman's terms and to discuss the problem with others.
4. To analyze the data by using very simple statistical calculations.

8.8 Forms Of Interpretation

The statistical data and the information may be interpreted in various forms depending in size and nature of data and the need of its interpretation. Some of the common and important forms of interpretation may be described as,

1. Relationship

Relationship is one of the most fundamental bases to find out. Unless comprehensive analysis of study is made, a true form of relationship between subject and object can't be determined.

2. Proportion

Proportion is generally ascertained to determine the nature and form of changes in the study.

3. Percentage

If the object of enquiry is to determine, the nature and approximation only for the particular objective, the method of percentage is the basis. Though the method of percentage is approximate and crude is often used in the sphere of absolute figures.

4. Average or the other Methods of Comparison

These methods are used to interpret statistical data and information. If a long statistical table is to be analysed and interpreted, the help of various forms of measuring the central tendencies relating to them should be taken. The average and other measures of comparisons are considered essential and form an integral part of the interpretation.

8.9 Interpretation of Data

The task of the researcher is not over just by presenting the data in tabular columns. He has to complete the analysis by presenting his findings in the form of empirical generalizations. He must do justice to his scientific pursuit by way of interpreting the data.

Interpretation is the process of identifying the independent variables and dependent variables in a series of data. Interpretation may confirm an old theory relating it to a new data; or, it may lead to the establishment of a new theory.

Research interpretation is also an effort to establish continuity in research through linking the results of one study with those of another. Secondly, interpretation leads to the establishment of explanatory concepts. Beneath what the researcher, observes in the course of study, lies a set of factors and process, which may explain whom he has observed in the empirical world.

Interpretation includes several other issues involving the relationship among the variables. They are (1) Contingency and group differences, associative or functional (2) co-variation versus causal and (3) significant versus important, in theoretical inferences 1) the variables are empirically related. 2) The variables and concepts are related and 3) the concepts are related. In the case of policy inference,

that is where it has policy implications, interpretations must be made with caution.

i. Interpretation Of Results

Objective standards must be followed while interpreting research findings. The researchers must be well trained in the art of interpreting results. They must be trained to interpret results with utmost caution so as to enable an objective assessment. Objective interpretation of results gives understanding of the general factors, which in turn can serve as a guide for further research studies.

8.10 Pre-Requisites for Interpretation

The following are the pre-requisites, which the researcher should bear in mind while interpreting the result.

I. Homogeneity of Data

Data must be homogeneous. Homogeneity of data helps comparability of different situations. Suppose you want to collect data about property crimes from different police stations and make a comparative analysis. If the data collected by you from different of a city are not homogeneous, your comparison will go wrong. To collect data that are homogeneous you must use the same definition of poverty in all the places from which you collect data. So homogeneity is to be ensured even at the time of data collection.

ii. Adequacy of Data

Interpretation of data will be wrong and misleading if the data are inadequate. Suppose you examine the efficiency of two or three officers only in a company where there are forty officers and generalize their efficiency for the company officers as a whole, your generalization will be wrong or misleading. That is why it is said that for meaningful interpretation you must have adequate data.

iii. Appropriateness of Data

The data that have been collected must be appropriate to the objectives the researcher wants to achieve. If the data collected are inappropriate, the results drawn will be wrong and misleading. Even, if the interpretation is objectively done, inappropriate data will resuit in biased or wrong interpretation.

iv. Scientific Data Analysis

It is not enough if the data collected are adequate and appropriate, proper methods must be employed for analyzing the data, wrong conclusions and incorrect interpretation will be made if the quality of the analysis is poor. Therefore, modern sophisticated statistical techniques should be used for data analysis.

8.11 Guidelines for Interpretation

Interpretation of results must be done in a proper manner. The following guidelines will help the researcher to interpret the results properly.

i. Make Correct Generalizations

It is not always possible to conduct census. Researchers often study the characteristics of a sample. One will have to be very careful while making generalizations with the help of sample estimates. When you study the leadership behavior of 100 women administrators in a particular organization, if you try to say that all women administrators in any organization would exhibit the same leadership behavior, then your generalization would be false for the reasons as follows.

i. 100 women administrators are too small a sample to make generalization.

ii. The sample you have studied constitutes the women administrators belonging to only one organization.

8.12 Generalization

A science is concerned with generality of things. A generalization is a general proposition regarding classes, objects or events or the existence of a definite relationship among certain type of events, objects or classes. A generalization is applicable to the entire class of objects or events and also individual cases, which are included in the class to which they belong.

Check Your Progress

5. What is generalization of data?

The scientist gives a general explanation of objects or events or phenomenon as he observed. The ultimate task of a scientist is to generalize. Generalization indicates the completion of the scientific investigation for the time being. When new facts or knowledge are gathered, the investigation must be continued further. In the light of the

new investigation, the old generalization may be modified and given up.

No generalization in science is a closed one. It may change as and when new facts emerge. The present generalization may become the basis of future investigation into facts and circumstances and therefore it may be the basis of future generalization.

Scientific generalization speaks of the tendencies or uniformities. They are based on inductive method^ Scientific generalizations are uncertain, provisional or tentative propositions. However, generalizations are useful in science with the use of statistics.

8.13 Types of Generalization

1. Empirical Generalization

This type of generalization is based on empirical observations or experience. This type of generalization explains the phenomenon as experienced or observed by the scientists as a process of investigation. Empirical generalization is the basis of further investigation into the causes or the phenomenon observed by the scientist.

2. Explanatory Generalization

This type of generalization provides the explanation regulations or uniformities as observed by the scientists. It explains the cause of the phenomenon. It is the end product of scientific investigation. It is the next step to empirical generalization and it occupies a higher place in scientific investigation.

i. Be Careful In Drawing Conclusions

The researcher must take extra care while drawing conclusions. The conclusion thus drawn should not go against the facts, the data and the hypothesis.

ii. Be Fair And Unbiased

You may have bias, prejudices and inhibitions but do not allow them to get reflected in the interpretation of results. When two students failed in the examination, one student thought that his future was doomed. He was a pessimist. Another student did not take his failure that way. He thought that it was a lesson for him to work hard thereafter. He took it as a challenge to achieve success in the next

examination. He was an optimist. You may either be pessimist of an optimist. But as a researcher you should never allow your pessimism or optimism to guide you to interpret the results. As an interpreter you must be unbiased, fair minded and interpret the results objectively.

iii. Be Careful In Using Statistical Concepts

One statistical concept which is often wrongly interpreted is the concept of correlation coefficient. In one study it was found out that there was high degree of correlation between the scores of two subjects of a group of students. The researcher interpreted that the students who do well in one subject would do well in another subject. It may be sometimes true of intelligent students. But with regard to average or below average students such interpretation will not hold good. So the researcher must use such statistical concepts with abundant caution.

8.14 Computerization of Data in the Criminal Justice System

Computerization is now extensively applied in the Criminal Justice System (CJS). The CJS start with the occurrence of a crime and its investigation. Investigation leads to prosecution and conviction of the accused. The last 10-15 years in particular, have been witnessing computerization of the entire CJS, and also most functions of the police administration have been computerized. Various stages of computerization is explained in the following paragraphs.

a. Police Stations

Police station is the grass root structure of the police administration. Major police stations in the city and rural areas have been computerized during the last 5-10 years, with terminals connected to the police chief of the city or district. All facts and figures about the station and details about all the occurrences of crimes in the jurisdiction of the station are entered in the computer. This means, the commissioner of police of the city or the SP of the district can access the system of any police station and see the crime situation for himself. This, no doubt, has improved the control mechanism of the police administration. The crime particulars of the police stations are passed on to the City Crime Records Bureau (CCRB) and the District Crime Records Bureau (DCRB) where they are computerized.

b) Crime Records Bureau (CRB)

The Crime Records Bureau receives the comparative crime statements of all the police stations and compiles them. The city CRB complies the statements sent by all city stations and the district CRB compiles all the statements sent by the rural stations. The comparative crime statements consist of the year wise figures relating to all occurrences, such as cases registered, cases under trial, cases detected and undetected, along with percentage of cases convicted and property recovered.

The CRBs at the city and district levels are not only linked with their state HQs, and other cities and districts but also with the police HQs of other states in India. In the event of an inter state crime committed by a criminal gang, the CRB concerned through their police HQs, can contact other police HQs. Such information, in turn, are also made available to the criminal courts in connection with any legal proceedings of a particular case.

c. The Modus Operandi Bureau (MOB) / State Crime Records Bureau (SCRB)

The MOB at the state level collects the crime details of the cities and districts from the respective CRBs and compiles into state level figures. These figures along with all information relating to the criminals involved in crimes are then forwarded to the National Crime Records Bureau (NCRB) at New Delhi, which functions under the control of the central Home Ministry. At every stage, the data and other information are classified and codified through the computers and are kept readily available for any official reference and to the researchers.

d. The National Crime Records Bureau (NCRB)

The NCRB is the apex body of the country with regard to all details about cognizable crimes taking place all over the country. All the information received from the state police H.Qs about the crime details are further classified and codified into compact statistical units. These information in turn, are passed on to the Bureau of Police Research and Development. The NCRB stores these information

maintains all the crime details in CDs which are made available to genuine researchers, not only in India, but all over the world.

At the police station level, the Station House Officer (SHO) prepares the 10 year comparative crime statement. This is a moving statement with continuity. That is, at anytime, the statement shows the crime figures for the latest 10 years, by adding the current year and by dropping the earliest year.

e. Computerization of the Criminal Court Proceedings

Proceedings of the criminal courts at the levels of high courts and Supreme Court are being computerized by the court's computer section. Once a case is over, the judgment is stored and preserved in computers, thereby reducing the paperwork and the risk involved in maintaining the papers for years together.

f. Computerization of the investigating branches

The investigating branches and wings all over the country such as the city and district crime branches, the CB-CID, the CBI, and the Intelligence Bureau are computerized with all its advantages. For example, various pieces of information given by the on lookers about the facial features of a criminal or terrorist are put together and tallied with the available photo figures of the criminals. Such facilities also enable the researchers to have access to unclassified vital information in the website of the police department.

8.15 Summary

Processing of data refers to consolidation, recasting or regrouping of data so that it is amenable to analysis. Analysis of data refers to seeing the data in the light of the hypothesis or objectives and the prevailing theories, and drawing conclusions. Processing of data is an integral part of the research design. The stages in data processing are i. Editing, ii. Coding, and iii. Tabulation. Classification means grouping of related facts to classes. Classification has the following objectives:

i. To condense the mass of data in order to note similarities and dissimilarities, ii. to facilitate comparison, iii. to pinpoint the most significant data at a glance iv. to give prominence to important

information and drop out unnecessary elements and v. to enable a statistical treatment to the material collected.

Data may be classified as i) Geographical Classification, ii. Chronological Classification iii. Quantitative Classification, iv. Qualitative Classification v. Classification According To Class Intervals, I. Class Limits, ii. Class Interval, and iii. Class Frequency. After editing and coding is complete, the data must be put together in a table form. Tabulation can be done manually or by computers. The contents of a table are 1. table number, 2. title , 3. caption, 4. stub, 5. body, 6. head note and 7. foot notes. Three types of tables generally prepared. They are simple or one-way table two-way table and higher order table.

With regard to statistical application there are two types of analyses. One is descriptive analysis and the other is inferential analysis. Some of the common and important forms of interpretation may be described as, 1. relationship, 2. proportion, 3. percentage, 4. average or the other methods of comparison, and i. interpretation of results. the pre-requisites for interpretation are viz., 1. homogeneity of data, 2. adequacy of data, 3. appropriateness of data and 4. scientific data analysis. There are certain guidelines for interpretation. The types of generalization are viz., 1. empirical generalization, and 2. explanatory generalization . Computerization is now extensively applied in the Criminal Justice System (CJS). The CJS start with the occurrence of a crime and its investigation. Various stages of computerization is done beginning from a. Police Stations, b) Crime Records Bureau (CRB) , The Modus Operandi Bureau (MOB) / State Crime Records Bureau (SCRB), d. The National Crime Records Bureau (NCRB), e. Computerization Of The Criminal Court Proceedings and f. Computerization of the investigating branches.

8.16 Key Words

Editing	Removing the unwanted data and keeping only the relevant data.
Coding	Coding is "converting the qualitative data in the questionnaire to numerical form and presenting it on the coding matrix.
Classification	Grouping of related facts to classes
Tabulation	An exhibit of numerical data systematically arranged in labeled columns
Generalization	A general proposition regarding classes, objects or events or the existence of a definite relationship among certain type of events, objects or classes.

8.17 References

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8.18 Answers to Check Your Progress

Question No.	Section
1	9.1
2	9.1
3.	9.2
4	9.4
5	9.11

8.19 Model Questions

1. Explain the process of removing the unwanted data from the questionnaire.
2. Describe the process of classification, tabulation and data processing in a research work.
3. Discuss the stages of coding the data.
4. What is the significance of classification of data in a research work?
5. Trace the different methods of tabulation.

Unit 9

Report Writing

Introduction

The results and inferences obtained at the end of a research project should be communicated to the concerned researchers, officials and various universities. This can be done by way of a research report to all concerned. The report comprises several stages such as drafting, writing of the report etc. This part is the end product of the research project. In this Unit the various aspects of a research report are discussed.

Objectives

The following stages of a research report are discussed in this Unit.

- Planning of a Research Report
- Technical Expertise to obtain clarity in a Research report
- Types of Research Report
- Structure of a Research Report
- Writing Style of a Research Report

Unit Structure

9.12 Answers to Check Your progress

9.13 Model Questions

9.1 General Criteria

The inference and findings of the research work must be communicated to the audience. Report Writing is the most important part of social science research. Before writing the report, the researcher must be clear about the following criteria

1. Audience
2. Purpose
3. Medium
4. Writing style
5. Content
6. Ethical responsibility

1. Audience

The audience who would read the report can be classified as scientists of basic or applied research practitioners Policy-making sponsors of research and general public. The scientists would expect the research to be precise, accurate and tightly structured and presented in such a way that helps themselves a problem. For practitioners new information is given. Therefore, it must be clearly explained is the case of policy makers as audience, it should show its improvement over the existing policy. Sponsors expect technical improvements. charts. maps etc .Therefore, the research report should focus on the specific audience for when it is addressed.

2. Purpose

The purpose of the research could be verification, replication or extension of a body of knowledge of normative information or revolutionary information. Depending on the purpose only the writing style is employed.

Check Your Progress

1. What are the general criteria of a research report?

3. Medium

The selection of the medium is determined by the larger audience. The media could be a journal (in the form of an article, of report or book, papers in a conference)

4. Writing Style

There is no strict restriction placed on the writing style. General usage favors the impersonal style. It is always interesting to read if the writing is in active voice rather than in passive voice. Use of simple sentences is preferred to complex structure. Tables or visuals should be followed immediately by its explanation. Writing for a book is different from a report submitted to the government,

5. Content

The content of the report is generally organized in five major sections.

i. The statement of the problem.

ii. Study design and procedure

(Objectives, method of sampling, data collection, technique and statistical analysis)

iii. Analysis and interpretation

iv. Conclusions and discussions

v. Bibliography

This organization would vary depending on the purpose and audience.

vi. Ethical Responsibility

The researcher must maintain ethical responsibility in the report which includes 1) protecting the respondents and collaborator in the study (2) providing accurate and complete information since confidentially was promised at the beginning of the research to the respondents, their interest identity must not be disclosed. This is an essential ethical responsibility of the researcher. Secondly, inaccurate information would damage even the existing body or knowledge.

Goode and Hatt point our few aids to the researcher to check whether the work is good, sufficient and presentable. They are,

i. The researcher has to check whether he has made the hypothesis explicit.

ii. He must present the observational and reading background, which led to the hypothesis.

iii He must make sure whether the hypothesis are stated in scientific terms.

iv. The researcher should verify whether the plan of the research has been presented in detail.

v. He must take certain, the observations and propositions derived are tabulated and presented.

vi. Finally, he must read again to check if the report summarizes all the points and finding of the research.

9.2 Guidelines For Clear Presentation

i. Footnotes: Footnotes give credit to the predecessors of the study. It should follow a specific style throughout the report as given in manual style.

ii. Sub-heading : Use of sub-headings calls the attention of the reader and also gives clarity to the report.

iii. Maps charts and graphs : By presenting maps, charts and graphs the meaning of the data and explanations are grasped quickly.

9.3 Significance of the Report

Apart from all these requirements, the researcher should take special care in using a scientific language, to explain findings. The report should end with a conclusion containing the suggestions by the investigator.

i. It is the means whereby the data analyses and findings are placed in an organised and permanent form. If it is the systematic record of research, then it will serve as an essential reference for research along related lines.

ii. The quality of the research work is to be judged mainly by the report. The report is the index of the researcher's skill and performance.

iii.The effectiveness of the report will determine the action/policy to be framed, Appropriate action or policy may be taken by the decision-makers or administrators if report is lucid one properly organized. Many sound research projects have had no effect because their results are badly presented.

The readers of the research reports are :

i. The layman and the general public;

ii. The administrator and the project sponsor and

iii. The fellow researcher or the technical export

9.4 Types of Reports

Before the presentation of the report, the researcher has to consider the potential evidence, the total research situation, their technical background and knowledge. The report may be short report or a long report.

At the beginning of the short report, there should be some brief statement concerning the authorization of the study, the problem to be examined in its breath and depth. Following this statement a summary should come along with the conclusions and recommendations. Short reports are appropriate for studies in which the problem is well defined. Such studies of limited scope require only limited time, personnel money, and for its methodologies are simple and straightforward.

The long report may be technical report or a popular report. The technical report is prepared for a specialist who is interested in understanding the technical procedure and terminology used in the research project. The report will be in technical language.

The popular report is intended for persons who have limited interest in the technical aspects of the research methodology and research findings. The audience will include layman and even top executives who want summary reports.

When the audience comprise of both technical and non-technical people it will be necessary to develop a composite report that serves both audiences. In such a situation appendices may be used to include technical data.

Check Your Progress

2. State the types of research reports.

i. Research Report

In contains finding of the fact, analysis of the facts, interpretations, conclusions and recommendations. Based on the approach the reports may be divided under the following heads :

i. Business report or Memorandum

ii. Project Report

iii. Dissertation

iv. Commissions' enquiry report

v. Thesis.

A business report or memorandum is a simple business communication from top to bottom or from one functional area to another or any specific activity of day-to-day business.

A project report is a report of a project undertaken by a functional area or by any individual relating to business, industry or society.

On the basis of presentation, reports may be classified under the four heads namely.

i. Inductive reports
ii. Deductive reports
iii. Step by step reports
iv. Time sequence reports

The inductive pattern of report writing, the oldest form of reporting goes from the specific facts, figures, materials of research to general conclusions, summary recommendations and the like.

The deductive pattern of report is also known as executive, management or action getting report. These reports go from the general to the specific that is from more important matters to less important matters.

It is almost like a newspaper report. The executives want only the major findings and recommendations of the report. No voluminous details that are required for the technical reports are't required here.

Step by step report is a report on the functions or operations, frequently following one another during a particular period of time and this kind of report is useful for the manufacturing process of the industrial sector.

Time sequence report lays greater emphasis on the time element during the Operational period of the event. It'is a report written by merely following the sequence of time

Further a report may be classified into two kinds, namely technical and popular reports.

i. The Oral Report

Reporting particularly to the administrator may be oral or in writing. The oral report is a two way process. The oral report is

effective where policy recommendations are important. It also helps the investigator to communicate continuously with fellow workers. In Western countries and in business the use of oral report has been developed considerably.

ii. The Written Report

There are generally three kinds of written reports namely : i) report to the layman (the popular report) ii) report for the administrator and iii) the technical report.

iii. Report for the Administrator / Executives

This report is for the administrator or business executives or for a few fellow researchers. These reports are intended for decision miners. The busy business executives want primarily the "meat" of the research project-that is, the major conclusions and recommendations of the study. This report would be medium size, with same technical details and supporting data followed by a summary and the principal recommendations.

iv. Technical Report

It is a report by a researcher for another researcher. That is these reports are usually intended for scientific or technically trained persons, they would be interested particularly in specific descriptions of the entire procedures employed which would follow the introduction of the problem and hypotheses researched. They are also interested in the logical and statistical details that led to the conclusions. Tests of statistical significance tend to be desired by the readers. In giving conclusions, the whole development of the underlying data and reasoning to be given for the technical reader. These reports may also contain complicated technical appendices of on the methodology and complete bibliographies to provide the reader with further sources or substantiation. The technical report may be in different forms as follows.

i. A detailed report, generally by a specialist or by one investigating a particular aspect in the research team.

ii. A monograph

iii. An article for a professional journal and

iv. Full technical report.

The language, and presentation, volume and kind of explanation would vary among these four forms of technical report.

Thus, there are four important aspects in the technical report.

i. The nature of problem

ii. The research procedure (methodology)

iii. The data analysis and the result

iv. The implication drawn from the results

The information regarding these points are necessary to give adequate information to the readers.

In any research project, writing the report forms the tail end of an investigation. There are two stages in preparing the report, (i) during the investigation and (ii) after data collection, analysis and interpretation. The nature of problem, the methodology, the objectives and hypothesis of the study may be done even before starting the investigation. There should be movement of the report along with the development of the investigation.

There are three main stages in preparing the research report:

i. Organization / structure

ii. Write-up and

iii. Documentation,

Check Your Progress

3. What are the main stages in writing a research report?.

Before discussing these three major stages in preparing research report, imperative to know about the structure of research report, which is either in the form dissertation or thesis.

9.5 Structure of the Research Report

Generally a format of the research report consists of the following sections.

i. The preliminaries

ii. The text and

iii. The reference material.

9.6 Conventions of Writing-The Question of Style in Research Reporting

For any researcher, determination of the format will help them to be consistent throughout their research work. The content or

research report as well as the presentation of argument in a standard form are also so vital in research reporting and writing. The researcher is also advised to read widely on the special problems of form and style in thesis writing with particular reference so that subject area of his research. Once the format to be used has been determined, the researcher must be consistent throughout the writing.

Writing the report precisely requires a careful choice of word, which will serve to convey exact meaning. Proper presentation is an integral part of the whole project. Usually, in thesis / research writing, a third person is used. As general rule, personal pronouns such as I, We ,You, me, my, our and us should not appear except in quotation. A thesis should not consist of the reporting of personal experience or opinion; but it should be a critical analysis of a problem and presentation of evidence relating to that problem.

Sound reasoning and intellectual honesty have all marks of scholarly style. Quotations must be accurately cited and suitable acknowledged. The contributions of other writers must be recognized.

Research report recounts what has already been done, so it should be written in the past tense. There should be good reason for using present and future tenses essential for scholarly writing. An authoritative dictionary should be referred for correct spelling. Attention is also needed for grammar and punctuation. In thesis/research writing on no account abbreviations such as & and i.e., used. (Except in tables).

The research work normally represents the culmination of a substantial price of original work over a period of time. The research work is expected to make an original contribution to knowledge. Thus all the specifications mentioned above are to be taken into consideration by the researcher while he is writing the research report.

In preparing a research report, the first stage is ordering the parts and planning the writing. This organisation or structure of research report forms the base for preparing the report. The researcher has to plan how to arrange his ideas in a logical order. A well-conceived form helps to overcome wrong emphasis and to disiribute

the emphasis in the right places. This makes the work attractive and readable. In research writing, form and content are inseparable. For getting good communication, organisation of report is essential. Careful and patient planning are required to get good organisation. Communication of research results could be easily done by giving attention both for language and planning or organisation of the report.

9.7 Types Of Organizations

Broadly, the organization is categorized into three sections-the topical, the chronological and the mixed. The topical or horizontal organization indicates topics and sub-topics as basic to the writing and interrelates one topic with the other; topics Majority of the investigations belong to this category. The criminological form of organizations emphasizes the time and development aspects. The other form of organization is a *mixed* form. It depends upon the research problem and purpose, the time available for investigation, volume of data and other factors. It is thus best to combine the two approaches and adopt mixed form in structuring the report.

9.8 Content Of The Research Report

The business executives or the fellow researcher who writes a research report are to be told enough about the study so that he or she can plan in its general scientific context, judge the adequacy of its methods, and thus form an opinion of how seriously the findings are to be taken and if the reader wishes to repeat the study with other subjects. In order to give the reader the necessary information, it is necessary to detail the method and the general theoretical approach followed in the study. Therefore, the technical research report must cover the following points;

i. Introduction which deals with the statement of the problem with which the study is concerned and the scope of the enquiry.
ii. The research procedure (methodology), the study design, the nature of sample, the data collection techniques, the method of statistical analysis.
iii. The results

iv. The implications drawn from the results

1. Introduction

A research report should begin with an introduction dealing with i. The nature of problem and ii. The scope of the enquiry

The reasons for the study and its place within the theoretical context have to be explained and the reader must be prepared to follow the course of the report to enable him to appreciate fully the material, method and results. But, these three aspects need not be elaborated in introduction. Such elaboration is to be done in the succeeding pages. It is useful to discuss the importance of the problem and the investigation. The main purpose of the introduction is to give a lead or a prospective idea to the reader about the study.

The following points should find a place in the introductory chapter.

i. A lucid, complete and concise statement of the problem being investigated the general purpose of the study.

ii. A justification for the study, establishing the importance of the problem. In some disciplines, it is appropriate to indicate the limitations of the project and to define terms used in the study.

iii. A preview of the organisation of the rest of the report.

iv.A brief statement of the sources of data, the experimental procedure, or the proposed statistical treatment of the findings is included in the introductory chapter of small research papers. In a major experimental thesis a separate chapter is often devoted to these aspects under a chapter on 'methodology'.

2. Statement Of The Problem

Check Your Progress

4. Write the contents of a research report.

The first research report is the formulation and development of research problem-that is the issue investigated or hypothesis tested. Ordinarily, the research report starts with the statement of issue on which the study was focused. Enough background should be given to make clear to the reader why the problem was considered worth investigating

The chapter on the statement of the problem should explain the scope of the study, pointing out clearly the limits and limitations if any in the study. In every study it is necessary to state the limitation of the

study such as the time and the finance allowed and restrictions in reporting it. These should be clearly defined Moreover, it is necessary to make certain assumptions. If assumptions are made in the study, they should be stated clearly. Nothing should be taken for granted.

3. The Methodology of Research Procedure

The scientific reader needs to know in considerable detail how the study was carried out The methodological chapter is the most crucial in the technical report. It indicates to a fellow researcher the hold the young investigator has over the technical apparatus. The discussion under the methodology chapter should be related to three items.

I. The Basic Design of the Study

If the study is an experimental one, what are the experimental manipulations? If it is through questionnaire, what are the questions and the nature and kind of interview? -Everything is to be determined and explained here;

Ii. The Nature of Sample

Regarding the sample used in the study, readers should be told: who are the subjects? How many are there? How are they selected-that is, the subject-the universe, the sample size, choice etc. are to be determined. These questions are crucial for estimating the probable limits or generalization of the findings, Nevertheless, the number and characteristics of the subjects on which, the findings are based should be clearly stated - sò that readers can draw their own conclusions about the applicability of the findings to other groups.

iii. The Data Collection Techniques and Statistical Analysis of Data

It is essential to discuss thoroughly the type of data employed, their sources and characteristics. A field survey describes in full the manner of conducting it and discusses response rates, validation and representativeness of the sample, etc. If secondary data are used as for example, the data available from CRB, MOB or NCRB explain how far original sources are checked for suitability of data to the problems. Scientific readers are concerned with the statistical analysis of the data

Check Your Progress

5. Write down the methodology of research procedure.

by using statistical tools and techniques. Ordinarily, it is sufficient simply to name the technique used. If the technique is a new one, formulae are to be given.

4. Presentation of Facts

The next step is the presentation and analysis of the data leading to their interpretation. In the case of fieldwork, the findings should be sustained by supporting statistical tables, charts diagrams and so on. In the case of bibliographical research, the findings should be sustained by adequate citation of the source.

Too many tables, too much of statistics or too much of citations may be avoided. The supporting data in the text may be minimum. If it is absolutely necessary to give some detail it should be condensed.

5. The Findings

The basic rule in presenting findings is to give all the evidence relevant to the research question asked, whether or not the results are in accordance with the investigator's views. This is the cardinal rule of scientific reporting.

The first essential point in presenting the finding is to make them plain and understandable. Clarity, precision, correct emphasis and proper sequence become all-important. It is necessary to explain how the findings are derived from the preceding data and how already known facts are relevant to the current investigation. This requires avoiding written explanation where tables and charts in the text are given. It is essential to indicate clearly and precisely how far his investigation agrees with other findings and how far it differs; making it plain why it differs, and to what extent such differences suggest further investigation.

6. The Implication

A bare statement of the findings is not enough to convey their meanings; usually the reader is interested in their implication for the general understanding of the research problem. Discussion includes three major aspects.

i. Statement of the inferences drawn from the findings which may be expected to apply in similar circumstances. This inference may be at

a level quite close to the data may involve considerable abstraction.

ii. The investigators should note conditions of their studies that limit the extent of legitimate generalization. They should remind the reader of the characteristics of their samples and the possibility that they differ from larger populations to which one might want to generalize.

Implications will usually relevant questions that are still unanswered or new questions raised by the study.

Thus implications pinpoint the real significance of the facts and findings.

7. The Conclusion

Facts are what the researcher found, findings are what were logically derived from the facts and implications are what the researcher was able to draw from the findings themselves. The conclusions are in fact, the researcher's final assessment of what the data and the findings mean. The conclusions have to look backward to the work done to the facts, findings and implications and look forward to the applications of these aspects. At this stage, the researcher demands three things.

8. Recommendations

The recommendation and conclusions must be in clear, categorical and crisp terms. The researcher's job is not to dictate but to suggest; bearing in mind that any piece of investigation is only one of the factors helping to decide policy and therefore has suggestions may not find acceptance.

9. Project Summary

A summary of the investigation would be highly useful. It is customary to include with a very brief summary restating in barest outline the problem, the procedure, the major findings and the major conclusion drawn from them. Its purpose is to enable the reader to get a quick overall view of the work, No new idea or fact should be introduced in the summary.

9.9 Summary

Before writing the report, the researcher must be clear about the following criteria viz., 1.Audience for the report, 2. Purpose for which the report is written, 3. The medium of writing, 4.writing style, content of the report and the 6. On whom the ethical responsibility of writing such a report rests with. The guidelines for clear presentation are that the research writing should contain foot notes, sub headings and maps, charts and graphs. The researcher should take special care in using a scientific language to explain findings. The report should end with a conclusion containing the suggestions by the investigator. The report may be short report or a long report. In contains finding of the fact, analysis of the facts, interpretations, conclusions and recommendations. Based on the approach the reports may be divided under the following heads viz., i. Business report or Memorandum, ii. Project Report iii. Dissertation, iv. Commissions' enquiry report and v.Thesis. On the basis of presentation, reports may be classified under the four heads viz., i. Inductive reports, ii. Deductive reports, iii. Step by step reports, and iv. Time sequence reports. Further a report may be classified into two kinds, namely technical and popular reports. The other type of reports are

i. The Oral Report, ii. The Written Report , iii. Report for the Administrator / Executives and iv. Technical Report. There are three main stages in preparing the research report viz., i. Organization / structure, ii. Write-up and iii. Documentation. Generally a format of the research report consists of i. The preliminaries, ii. The text and iii. The reference material. The content or research report as well as the presentation of argument in a standard form are also so vital in research reporting and writing. Proper presentation is an integral part of the whole project. Broadly, the organization of the thesis is categorized into three sections-the topical, the chronological and the mixed. Therefore, the research report must cover the following points;

Introduction, ii. The research procedure (methodology), the study design, the nature of sample, the data collection techniques and the

method of statistical analysis, iii. The results and iv. The implications drawn from the results, suggestions, conclusion and summary.

9.10 Key Words

Technical aspects in a Thesis	that contains, foot notes, sub-titles, Research Report charts. maps etc
Peoples Report	Report written in simple language that can be understood by the common man
Technical Report	Technical explanations for the steps adopted in a research report for the perusal of a fellow researcher.
Foot Note	Acknowledging and thanking other scholars for borrowing their ideas in the thesis and to enable future research to find sources for their work.
Reference	Citing titles, reports, articles of others referred to in the thesis
.Quotation	An extract of an original data adopted from other books etc.

9.11 References

1. Janathan Aderson, Berry H. Durstam and Millicenay Poole - Thesis and Assignment Writing.

2. M.H.Gopal, Introduction to Research Procedure in Social Sciences, 1910.

3. Claire Sellitz, Lawrence Wrightsman and Stuart W.Cook, Research Methods in Social Relations, 1971.

9.12. Answers to Check Your Progress

Question No.	Section
1	9.1
2	9.4
3	9.4
4	9.9
5	9.9

9.13 Model Questions

1. What are the aspects to be considered before planning to write a research report?
2. Discuss the types of research report.
3. Explain the structure of a research report.
4. State the contents of a research report.
5. Write about the writing style of a report.

Unit 10

Model Research Report

Introduction

There is no standardized model for writing a research report. Depending upon the nature and scope of the research problem, the research model will differ. In this Unit an outline of a simple model of a research report is explained in detail.

Objectives

The following aspects of a research report are discussed here.

Divisions in a Research Report

Drafting of The Report

Documentation, Tables, Diagrams and

Editing The Final Draft

Unit Structure

10.1 Divisions in a Research Report

A research report comprises preface, introduction, description of methodology, description of the study area, presentation of facts: (analysis of data), summary and conclusions and appendices. They are discussed herein under.

I. Preface

(Acknowledgements, table of contents, declaration of research etc)

II. Introduction (Formulation of the problem)

i) Nature of the problem

ii) Importance of the study

iii) Objectives and scope of the investigation

iv) Hypothesis (one or more) if any

vi) Chapterization

III. Description of methodology

i) Definition-concepts-instruments (if any)

ii) Description of the method, (sources of data and statistical tools used in the study)

iii) Sampling techniques (field/statistical enquiries)

iv) Data collection techniques.

IV. Description of the study area

Area description in terms of topography, demographic feature, administrative set up, infrastructure etc.

V. Presentation of facts: (Analysis of data)

i) Nature and volume of facts

ii) Statistical analysis

a. Primary data analysis

b. Secondary data analysis

VI Findings of the study

i) Findings with supporting data in each case.

ii) Comparison with the similar studies.

VII. Summary and Conclusions

i) Summary

ii) Implications and conclusions

iii) Recommendations of the study (if any)

VIII. Appendices

i) Discussion of particular statistical techniques.

ii) Detailed discussion of terms, definition etc.

iii) Form of questionnaire/schedule.

iv) Additional tables, raw data, lengthy quotations etc. DC

Bibliography

10.2 Drafting of The Report

After the outline of the report has been finalised the next stage is drafting of the report. Outlines are the framework upon which long written works are constructed. They are an aid to the logical organisation of the material of the researcher to be emphasized in the report. Outlining of the research study is made up of two stages, namely beginning stage and the writing stage. The outline prepared at the stage of writing should be elaborate and it should be prepared at three stages, namely Topical, outline, Paragraph and Sentence Outline

Topical outline comprises chapters in broad aspects. Paragraph outline contains one idea behind paragraph. Sentence outline indicates the points to be included in sentences.

i. Reflecting Thinking

Research is a thinking process. It is a mechanical process of gathering information and presenting them. Reasoning power of the researcher is the efficient tool for research decision^ interpretation and generalisation. According to Whitney there is a high positive correction between good thinking and effective writing.

According to M.H. Gopal "Research is not merely the accumulation, evaluation and assimilation of facts, it is also and more so re-building them into meaningful whole. This demands patient, deep and alert thinking". A researcher must develop his thinking process

Check Your Progress

1. State the stages of a research outline.

ii. Outlining

Outlining is the outcome of the thinking process; it is the next step in writing the research report.

M.H. Gopal suggests the following points, while planning an outline.

1. The outline should be as detailed as possible

2. It shouldn't be vague.

3. It should fulfill the consideration of chronology, topical unity, coherence, and transition.

4. Each paragraph must contain one idea.

To make the research report scientific and attractive, the report has to be written three time. There are three steps in the actual write-up of the report, the first, and seconc and final drafts

10.3 First Draft

In the first draft, attention to be given for the substance to the report , that is, the fullness of facts. Along with substance, accuracy of facts is also taken into consideration Along with substance and accuracy, balance, transition and development of facts are also essential. In this first draft stage, language and form are of secondary importance. At this stage, the researcher should control over his notes so as to attain balance, development and overall unity in the report. The first draft has to be re-written a number of times and there are two main obstacles in the first draft stage (i) there would be gaps in facts, ideas and presentation, (ii) there may also be repetitions of notes. To avoid these two in the first draft stage itself, the researcher has to put the facts as coherently as possible. The statistical table, charts and diagrams should be kept separate from the text to avoid re-copying them at every revision. That is, they should not be written in every draft.

Check Your Progress

2. How many drafts a researcher should write?.

10.4 Second Draft

The researcher has to concentrate on form and language in the second draft stage. Considerable trimming that is, editing the report so as to make the writing precise, concise and brief should be done. Proper emphasis on the facts has to be given. Therefore, at this stage, critical evaluation of facts, findings conclusion, and suggestions has to be done. The following are some of the tips, which would help the young researcher to develop his report.

10.5 The Third Draft

The third is the final report. It concentrates mainly on the finish and final touches. This is, documentation and polishing the report so as to make the report attractive and authoritative. Final drafting is the last

step in thesis writing. The researcher should avoid abstract terminology and technical jargon. The draft should be concise and in objective style and in simple language. The report must combine clear interpretation and an effective style of writing.

10.6 Documentation

Documentation is the third stage in research reporting. A good research report depends not only the amount of reading or notes taken or the presentation of facts but depends, also upon the accurate and through recording of the investigation.

10.7 Components Of Documentation

Documentation has five components namely (i) footnotes (ii) bibliography (iii) quotations (iv) tables, charts and diagrams and (v) appendices.

i. Footnotes

Footnotes are the most important component in research documentation. They serve many purposes as given below.

(i) To acknowledge facts and ideas borrowed. This shows, the author's intellectual honesty. All the information given in the report is not the researchers own ideas. He has borrowed the findings and investigations of the previous researchers. Footnotes help other readers to verify the references made by the researcher.

(ii) It is provided as a reference to the source, which may be constituted for more details. Some points could not be discussed in detail in the text. These points would be discussed elaborately in footnotes.

(iii) It helps to identify a quotation "or citation and to acquaint the reader with the larger context of the problem. It also helps to distinguish one's own contribution from that another.

Thus footnotes are meant to

a) Validate a point-statement or argument.

b) Explain or supplement material that is included in the main body of the research report.

In footnote, following information are included.

a. Name of the author/source

Check Your Progress

3 What are the components of documentation?.

b. Title of the source

c. Page of the source of reference

d. Data of publication

a. Name of publisher and place of publication.

ii. Some Points To Be Remembered

i. It is better to insert footnotes at the first draft stage, when the researcher is fresh with the facts.

ii. Avoid too many or too few footnotes. Over - documentation is bad and under-documentation is worse.

iii. Try to conserve space and words while giving citation.

iv. Indicate the source correctly and fully that is, author, title, volume And page etc.

v. Footnotes should be brief, clear and concise. To have brief footnotes, clarity and readability should never be sacrificed.

vi. All footnotes regardless of length are terminated by a full stop.

vii. The same bottom margin should be maintained on each page of the typescript regardless of the number of footnotes.

viii. Verify the sources of footnotes carefully because an inaccurate citation may reflect on the scholarship and character of the researcher.

ix. There is general usage of commonly occurring abbreviations in footnotes.

10.8 Bibliography

Bibliography is an essential part in the research report; it contains information about books, reports, articles and other sources, relevant to the investigation. According to the purpose, the bibliography is of two kinds namely.

i) The working bibliography and

ii) The final bibliography

i. Working Bibliography

It is formed at the initial stage of the enquiry and even before the research problem is selected. It helps the researcher to understand the problem, to formulate the hypothesis and to start investigation it is

necessary to write down the titles on separate cards or slips to facilitate commenting on them and shuffling them whenever necessary.

ii. Final Bibliography

This is more important from the point of view of the reader. It is prepared on the completion of the report. It serves two main goals: (i) to help the researchers who are interested to study the problem further (ii) to verify the facts and the statements in the report. Depending upon the purpose, the form of the final bibliography varies in details.

iii. Forms Of Bibliography

There are different kinds of bibliography.

(a) Works Cited

It consists of a list of sources which have been referred to in the text or the footnote of the thesis.

(b) Sources Consulted

It consists of comprehensive listing of books and papers consulted. It is a broader kind of bibliography.

(c) A Select Bibliography

It contains those resources cited, together with the more relevant of the works, which have been consulted. It presumes that the researcher has read the reference listed among many others, that he has made a considered choice, that those listed art relevant, useful and the best in the researcher's judgment, and that he has made use of them in the researchers report, even though all the sources are not cited in the footnotes

(d) A Brief Annotated Bibliography

It is a list of references at least some of which are followed by a note on the content and usefulness of the references. It is characterized by the comments of the researcher on each title. The comments should always be brief, precise and suggestive. The comments must be readable and informative.

Generally, in research reports, the usual form of final bibliography is to classify the references consulted. The sources consulted may be of four kinds.

(i) Primary, secondary and tertiary sources (ii) printed and manuscript (iii) published and unpublished and (iv) books, reports, articles, pamphlets etc.

Thus, the form of bibliography its form, size and arrangement has to be related to the problem and the technique of investigation. The form of the bibliography is to be finished at the stage of reaching the second draft. All types of bibliography must be adequate in volume and relevant to the research problem.

There are two places in the report where a bibliography may be included: (i) at the end of each chapter or part (ii) at the end of the completed report. The 'chapter-end' list draws attention to the references particularly relevant to the chapter. The 'block end 'bibliography may or may not specify the pages relevant to a topic or chapter.

To make the bibliography selective, full and relevant, it is essential for the investigator to read the literature first and arrange the list of reference relating to that particular research problem. The main purpose of a bibliography is to guide the reader. Therefore the researcher should list all the literature, which he consider relevant to the problem though not cited in the footnotes.

10.9 Quotations

During 'note-taking', the researcher may copy extracts from sources verbatim, with the intention to incorporate them in the final research report.

Quotation serves two purposes.

Check Your Progress

4. What are the forms of bibliography?

(i) Facts may be taken over from another sources, either because it is fuller or earlier or because the facts are relevant to the current investigation but not as its major substance.

(ii) Opinion or facts may be either to support the investigator's own findings or to be controverted by him.

1. Points to be remembered while using Quotations

(i) A research report should not be stuffed with quotations. Over quoting can often be equated with poorly integrated argumentation.

(ii) A thesis should not be stuffed with quotations.

(iii) Quotations should be brief, not exceeding one or two lines

10.10 Tables and Diagrams

Tables and diagrams are useful when the research is statistic based. To present huge numerical data in comprehensible form, tables and charts are very useful. Among the three devices-tables, charts and diagrams; table is the basic form bringing out the findings of the investigation more vividly and quickly, it also facilitates comparisons. It is also economizes space to the final report and makes the report more readable and attractive.

Points to be remembered while using tables and diagrams.

(i) Be selective in any research project.

(ii) Make each table self-explanatory

(iii) Better limit each table to a single page

(iv) Do not repeat in the table what is found in the text or in the text what is in the table.

The length supporting in a research report if included in the body of the dissertation may make the text more difficult to read. By relegating such supporting evidence to an appendix, the reader can be directed to consult particular pages of an appendix for further detail- Thus appendices are useful for placing cumbersome material interrupting continuity of the main text; They are usually at the end of the main text.

The appendices are either technical or non-technical. Under technical head, three types of material are included namely (i) discussions of particular techniques (ii) elaboration of concepts, terms and definitions (iii) mathematical derivations and formula, additional graphs and charts.

The non-technical appendices are more numerous and common. They include (i) information useful and relevant but too elaborate for the text, (ii) Raw or supporting data and lengthy tables (iii) lengthy quotations (iv) forms of questionnaire, and schedules interviews forms etc (v) any facts, discussion, statistics, glossary and so on.

10.11 Editing the Final Draft

Before the final draft of the research report is typed, it should be carefully edited. It is the writer's responsibility to ensure that the text is free from spelling and grammatical errors. Questions of punctuation, capitalization, hypothecation and abbreviation should be referred to a recognized text of English language usage A research report or thesis submission should also consider the following specifications.

(i) A Note Regarding Headings

a. All headings should be captions and not sentences

b. Each should be brief, and informative

c. Each should be a statement rather than a question

ii. Spacing

a. The body of the text is normally double spaced; sometimes half-spacing is used for a lengthy report.

b. Convention requires different spacing for quotations, footnotes, tables and figures.

iii. Pagination

a. Each page in the report is given a number.

b.There are two separate series of page number. The preliminaries numbered using small Roman numerals (i, ii, iii and so on).
All other pages beginning with the first page of the chapter and including pages of tables, figures, bibliography and appendices are numbered with Arabic numerals.

c. Number of the pages usually appears without punctuations in the top right and corner of the page, one inch from the top and one inch from the right hand edge of the paper.

Check Your Progress

5. What are the aspects to be looked into while editing the final draft?

(iv) Margins

a. The margin recommended at the left of the pages is two inches, which allows for binding.

b. A margin of one-inch length is essential at the right hand side of the page.

c. Margins of two inches at the top and bottom of the page to be provided to get a balanced appearance.

(v) Final Step

a. Check the spelling and grammatical errors.

b. Check the headings, sub-headings, quotations; foot notes, tables, figures, references and appendices.

c. A special check for correct syllabic division of words at the end of lines. Read the proof (each page) carefully.

10.12 Ethics In Criminal Justice Research

A Research in social sciences is different from a research in the accurate sciences, as the former deals with the behavioural pattern of human beings. Basically, a good researcher must have his heart and mind in the research which he/she has undertaken. The attempts of a researcher must be sincere and honest at every point.

A researcher in Criminology may have to deal with criminals and crime variables. He has a special responsibility in that he may have to maintain the secrecy of classified information which, he might have been given access. He should be capable of collecting information without bias or prejudice and carry out the analysis without fear or favour. A good researcher in Criminology should not be carried away by the opinions of others which may distorting. There should be no place for emotions in the research work.

Researcher in Criminology is bound to face more hurdles in his research than a researcher in other disciplines. He needs to tackle them carefully and with gently. He may have to interview the inmates of the prisons. All information about them may have to be maintained confidentially. He should avoid hasty statements and should not lose consistency of methodology at any point.

10.13 Summary

A research report comprises the following sections. They are preface, introduction, description of methodology, description of the study area, presentation of facts (analysis of data), summary, conclusions and appendices.

The next stage is drafting of the report.. Outlining of the research study is made up of two stages, namely beginning stage and the writing stage. The outline prepared at the stage of writing should be elaborate

and it should be prepared at three stages, namely Topical, *outline,* Paragraph and Sentence Outline

Research is a thinking process. It is a mechanical process of gathering information and presenting them. There are three steps in the actual write-up of the report, the first, and second and final drafts. Documentation is the third stage in research reporting.

Documentation has five components namely (i) footnotes (ii) bibliography (iii) quotations (iv) tables, charts and diagrams and (v) appendices. Before the final draft of the research report is typed, it should be carefully edited. It is the writer's responsibility to ensure that the text is free from spelling and grammatical errors. The researcher should also consider an appropriate note regarding headings spacing, pagination, , margins, and final step. He should avoid hasty statements and should not lose consistency of methodology at any point. Ethics in criminal justice research should be observed by him always.

10.14 Key Words

Research	It is a thinking and mechanical process of gathering information and presenting them
Bibliography	It contains information about books, reports, articles and other sources, relevant to the investigation.
Select Bibliography	It contains those resources cited, together with the more relevant of the works, which have been consulted
Quotations	Copying extracts from sources verbatim, with the intention to incorporate them in the final research report.
Tables And Diagrams	Present huge numerical data in comprehensible form.

10.15 References

1. Jonathan Anderson, Berry H. Durston and Milliceny Poole. Thesis and Assignment Writing, 1970.

2. M.H. Gopal, Introduction to Research Procedure in Social Sciences, 1963.
3. Claire sellitz, Lawrence Wrightman and Stuart W. Cook, Research Methods in Social Relations. 1976.

10.16 Answers to check Your Progress

Question No.	Section
1	10.2
2	10.5
3	10.7
4	10.9
5	10.11

10.17 Model Questions

1. Explain the sections in a research report.
2. State how a draft report is prepared.
3. Analyze the process of writing foot notes.
4. Discuss the various forms of bibliography.
5. Describe how a final draft should be edited?

Model Question

RESEARCH METHODOLOGY

Time: Three hours **Maximum : 100 marks**

Answer any FIVE questions.

(5 x 20 = 100)

1. குற்றத்தினால் பாதிக்கப்பட்டோர்களின் ஆய்வு பற்றியும் மேலும் அவை எவ்வாறு பாதிக்கப்பட்டோரியல் ஆராய்ச்சியில் முக்கியத்துவம் வாய்ந்ததாக உள்ளது?

   Discuss in detail the crime victimization survey and its importance in Victiomological research.

2. விளக்குக
   (அ) எளிய சீரற்ற மாதிரி
   (ஆ) ஒதுக்கீடு மாதிரி
   (இ) தீர்ப்பு மாதிரி மற்றும்
   (ஈ) நோக்கத்துடன் செயல்படுகிற மாதிரி.

   Explain it:
   (a) Simple random sampling
   (b) Quota sampling
   (c) Judgement sampling and
   (d) Purposive sampling.

3. ஆராய்ச்சியால் அளவைகள் எவ்வாறு தீர்மானிக்கப்படுகின்றது? பொது மக்களின் பார்வையில் ஊழல் தடுப்பு பற்றிய ஆராய்ச்சியில் பொருத்தமான அளவில் நுட்பங்களை விளக்குக.

   How scales in constructed in the research? Explain the suitable scale techniques in the study of perception of public towards prevention of corruption.

4. குற்றவியல் ஆராய்ச்சியில் உண்மைநிலை மற்றும் நம்பகத்தன்மைகள் தேவை மற்றும் முக்கியத்துவத்தை ஆராய்க.

   Discuss in detail about various limitations I n the criminological research and explain with illustration.

5. குற்றவியல் ஆராய்ச்சியில் உண்மைநிலை மற்றும் நம்பகத்தன்மைகள் தேவை மற்றும் முக்கியத்துவத்தை ஆராய்க.

Examin the need and importance of validity and reliability in the criminological research.

6. இன்றைய குற்றவியல் நீதி அமைப்பில் குற்றம் மற்றும் குற்றவாளிகளின் தரவு கணினிமயமாக்கப்படுகதின் தேவை மற்றும் முக்கியத்துவத்தை விளக்குக.

Examine the need and importance of computerization of crime and criminal data in the current criminal justice system.

7. குற்றபுள்ளியியல் விளக்கவும். குற்ற புள்ளியியலின் பல்வேறு மூலங்கள் மற்றும் அதன் முக்கியத்துவத்தை ஆராய்க.

Explain the crime statistics. Examine the various sources of crime statistics and its importance.

8. குற்றவியல் நிதி ஆராய்ச்சியில் இரகசியம் மற்றும் நெறியுறைகளின் தேவை மற்றும் முக்கியத்துவத்தை விவாதி.

Discuss the importance of confidentiality and ethics in the criminal justice research.

9. குற்றவியல் ஆராய்ச்சியில் தரவுகளை பகுப்பாய்வில் தரவுகளை எவ்வாறு வகைப்படுத்துதல், குறியீட்டாக்கம் மற்றும் அடக்குவாறு முறையினை விளக்குக.

Explain how the data is classify, coding and tabulation in criminological data analysis.

10. குற்ற நீதி ஆராய்ச்சியில் அறிக்கை எழுதும் போது பின்பற்ற பல்வேறு படிநிலைகளை விவாதிக்கவும்

Discuss the various steps to follow the writing a report in the criminal justice research.
