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M.A. EDUCATION

SEMESTER: II

SUB.: METHODS OF EDUCATIONAL RESEARCH **UNIT : I - IV**

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QUANTITATIVE RESEARCH : CONCEPT AND CHARACTERISTICS

Unit –I **Lesson :1**

STRUCTURE

1.1 INTRODUCTION

Students have you observed that human mind is very curious and there is a scientific quest for understanding how it works. We as human beings want to know why we think, feel and behave as we do. What makes individual differences in human beings. Psychologists and educationists as scientists, answer these questions systematically. They develop principles to explain them and use those principles to solve various problems.

Research is a process through which new knowledge is discovered. It is a systematic and objective attempt to provide answers to certain questions. The word research is composed of two syllables, re and search which means to examine carefully and probe deeply to learn. According to (Grinnell 1993) The simplest meaning of research is to search for facts, answers to research question and solution for the problem.

Conducting research requires to follow a sequence of steps. These steps vary with the nature of the problem. The exact sequence and steps vary somewhat with the type of research.

1.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :

- Explain the concept of Quantitative Research
- Describe the purpose of quantitative Research
- Identify the characteristics of quantitative Research
- Describe the advantages Quantitative Research
- Identify the limitations of Quantitative research

1.3 CONCEPT

Quantitative research is a research strategy that focuses on quantifying the collection and analysis of data. It is formed from a deductive approach where emphasis is placed on the testing of theory. Quantitative research collects information from existing and potential customers using sampling methods and sending out online surveys, on line polls, and questionnaires, e.g. one of the main characteristics of this type of research is that the results can be depicted in numerical form.

Quantitative Research is the process of collecting and analyzing numerical data. It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations.

Quantitative Research is widely used in the natural and social sciences: biology, chemistry, psychology, economics, sociology, marketing etc.

Examples

How has the average temperature changed globally over the last century?

Does working from home increase productivity for people with long commutes?

There are four main types of Quantitative Research, Descriptive, Correlational, Causal-comparative/Quasi-experimental, and Experimental Research, attempts to establish cause-effect relationships among the variables.

1.4 PURPOSE

The purpose of quantitative research is to attain greater knowledge and understanding of the social world. Researchers use quantitative methods to observe situations or events that affect people. Quantitative research produces objective data that can be clearly communicated through statistics and numbers. This is done in a systematic scientific way, so the studies can be replicated by someone else. The data is primarily used to :

- Find patterns and averages
- Make predictions
- Test causal relationships
- Generalize results to wider populations

1.4.1 CHECK YOUR PROGRESS 1

Write your answer in the space given below :

Q1. Explain the concept of Quantitative Research .

Q2. Discuss the purpose of Quantitative Research in your own words.

1.5 CHARACTERISTS

Objective –Quantitative Research seeks accurate measurement and analysis of target concepts. It is not based on mere intuition and guesses. Data are gathered before proposing a conclusion or solution to a problem.

Clearly defined Research Questions – The researchers know in advance what they are looking for. The research questions are well defined for which objective answers are sought. All aspects of the study are carefully designed before data are gathered.

Structured Research instruments – Standardized instruments guide data collection, thus, ensuring the accuracy, reliability and validity of data. Data are normally gathered using structured research tools such as questionnaires to collect measurable characteristics of the population like age,socio-economic status, numbers of children, among others.

Numerical data – Figures , tables or graphs showcase summarized data collection in order to show trends, relationships or differences among variables. In sum, the charts and tables allow you to see the evidence collected.

Large sample sizes- To arrive at a more reliable data analysis, a normal population distribution curve is preferred. This requires a large sample size, depending on how the characteristics of the population vary. Random sampling is recommended in determining the

sample size to avoid researcher's bias in interpreting the results.
Replication – Qualitative methods can be repeated to verify findings in another setting, thus strengthening and reinforcing validity of findings eliminating possibility of spurious conclusions.
Future outcomes- By using complex mathematical calculations and with the aid of computers, if then scenarios may be formulated thus predicting future results. Quantitative Research puts emphasis on proof, rather than the discovery.

Self Assessment Questions

1) An investigator comes up with a new ideas or a different way of thinking is known as context of discovery. (True/ False)
2) Descriptive research is a type of quantitative research. (True / False).
3) Quantitative research puts emphasis on the discovery. (True/False)
4)The correlation study is reltively easy to design and conduct. (True / False)
Answers

(1) True (2) True (3) False (4) True.

1.6 METHODS

Quantitative Research methods can be used for descriptive, correlational or experimental research.
Descriptive Research
Descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and, whenever possible, to draw valid general conclusions from the facts discovered. They are restricted not only to fact finding but may often result in the formulation of important principles of knowledge and solution of significant problems concerning local, state, national and international issues. Descriptive studies are more than just a collection of data, they involve measurement, classification, analysis, comparison and interpretation. They collect and provide three types of information: (1) of what exists with respect to variables or conditions in a situation (2) of what we want by identifying standards or norms with which to compare the present conditions or what experts consider to be desirable and (3) of how to achieve goals by exploring possible ways and means on the basis of the experience of others or the opinions of experts.
Correlational Research
Correlational studies are a frequently used types of descriptive research concerned with determining the extent of relationship existing between variables. They are used to obtain

description of existing phenomenon and enable a researcher to ascertain the extent to which variations in one variable are associated with variations in another. The magnitude of the relationship is determined through the use of the coefficient of correlation. For instance, on the basis of earlier studies a researcher may hypothesize that there is a relationship between performance of an intelligence test and a test of achievement in arithmetic. The correlation technique will help him to test his hypothesis about the relationship between these two variables as well as to assess the magnitude of the relationship. The correlation study is relatively easy to design and conduct. It involves the collection of two or more sets of measurement on a sample of subjects and computation of the coefficient of correlation between these sets of measurements.

Experimental Research

Experimental Method establishes a systematic and logical association between manipulated factors and observed effects. The researcher defines a problem and proposes a tentative answer or hypothesis. The researcher tests the hypothesis and accepts or rejects it in the light of the controlled variable relationship that he has observed.

Experimental Research is mainly used in science subjects such as physics, chemistry, medicine, biology etc. Experiment requires two variables, one independent variable, and the other dependent variable. It is important that in experimental research the independent variable is manipulated and the effect of manipulation is observed on the dependent variable.All other extraneous factors are completely controlled within the laboratory. It is based on research design which uses manipulation and controlled testing to understand the causal processes. Generally, we can manipulate one or more variables to determine their effect on a dependent variable. In other words, it is a systematic and scientific approach to research in which the researcher manipulates one or more variables, and controls and measures the other variables.

John Stuart Mill (1846) stated five canons or rules of experimental research

- The method of agreement
- The method of difference
- The joint method
- The method of residues and
- The method of concomitant variations.

Self Assessment Questions

Fill in the blanks
1) Descriptive research is one of the important methods of _____ research.
2) Correlation studies are concerned with determining the extent of relationship existing between_____.
3) Experimental research studies the relationship between two variables _____ and _____.

Answers
1) Quantitative 2) Variables 3) independent, dependent.

1.7 ADVANTAGES

The advantages of Quantitative Research include the following:

- It is objective. The most reliable and valid way of concluding results, giving way to a new hypothesis or to disproving it. Because of bigger no. of sample of population, the results or generalizations are more reliable and valid. Since it provides numerical data, it can't be easily misinterpreted.
- The use of statistical techniques facilitates sophisticated analyses and allows you to comprehend a huge number of vital characteristics of data.
- It is real and unbiased. If the research is properly designed it fitters out external factors, and so can be seen as real and unbiased.
- The numerical data can be analyzed in a quick and easy way. By employing statistically valid random models findings can be generalized to the population about which information is necessary.
- Quantitative studies are replicable. Standardized approaches allow the study to be replicated in different areas or over time with formulation of comparable findings.
- Quantitative experiments are useful for testing the results gained by a series of qualitative experiments, leading to a final answer, and narrowing down of possible directions to follow.

1.8 DISADVANTAGES

Quantitative Research requires a large no. of respondents. It is assumed that the larger the sample is the more statistically accurate the findings are.

It is costly. Since, there are more respondents compared to qualitative research, the expense will be greater in reaching out to these people and in reproducing questionnaires.

The information is contextual. Factors to help interpret the results or to explain variations are usually ignored. It does not consider the distinct capacity of the respondents to share and elaborate further information unlike quantitative research.

Much information is difficult to gather using structured research instruments, specifically on sensitive issues like pre-marital sex, domestic violence among others.

If not done seriously and correctly, data from questionnaire may be incomplete and inaccurate. Researchers must be on the look out on respondents who are just guessing in answering the instrument.

1.8.1 CHECK YOUR PROGRESS 2

Note : (a) Write your answers in the space given below:
(b) Compare your answers with those given at the end of the lesson/ above sub-section.

1. Which of the following statements are true :-

a) The first step of research process is identifying a problem. T/F
b) Selection of particular data collection method depends on the nature of study. T/F
c) Purpose of Quantitative research is to attain scientific knowledge. T/F
d) Research is a process through which old knowledge is discovered. T/F
e) To conduct Quantitative research is costly. T/F

2. What do you mean by structured Research instruments?

_____
_____

3. Give any two disadvantages of Quantitative research.

1.9 LET US SUM UP

From the above discussion, we conclude that Research is a careful, systematic, patient study and investigation in some field of knowledge, undertaken to establish facts or principles. The purpose of research is to discover answers to questions through the application of scientific procedures. The main aim of the research is find out the truth which is hidden and which has not been discovered as yet. Conducting research requires to follow a sequence of steps. The

steps vary depending upon the quantitative or qualitative approach.
Quantitative research deals in numbers, logic and an objective stance. Quantitative research focuses on numeric and unchanging data and detailed, convergent reasoning rather than divergent reasoning (i.e the generation of a variety of ideas about a research problem in a spontameous, free-flowing manner). In addition Quantitative research is important because it enables us to conduct research on a large scale; it can reveal insights about broader groups of people or population as a whole; it enables researchers to compare different groups to understand similarities and differences; and it helps business. Quantitative research produces objective data that can be clearly communicated through statistics and numbers. This is primarily done in a systematic scientific way so the studies can be replicated by someone else.

1.10 KEY WORDS / GLOSSARY

Structured : Data organized in a standardized, easily searchable format, often resembling tables with rows and columns ; standardized ; the use of uniform consistent procedures in all phases of data collection.
Replication : Copy; reproduction of the similar phenomena or concept; the action or process of reproducing or duplicating.
Descriptive Research : to obtain pertinent and precise information concerning the current status of phenomena.
Correlation : Determining the extent of relationship existing between variables.
Manipulate : The deliberate alteration of a variable (Independent Variable) by a researcher to observe its effect on another variable(Dependent Variable).

1.11 **Self –Assessment Questions**

Elucidate the concept of Quantitative Research.
Explain the various characteristics of Quantitative Research.
Describe the value of quantitative research in education.
Describe the nature of quantitative research.

1.12 Suggested Further Readings

Koul, Lokesh : Methodology of Educational Research
Aggarwal Y.P; The science of Educational Research

Kumar. R (2006) Research Methodology, New Delhi; Dorling Kingsley
Grinnell, Richard Jr (ed) 1988, social work Research and Evaluation (3rd edition) Itasca, Illinois, F.E.Peacock Publishers

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HISTORICAL RESEARCH (CONCEPT, STEPS, TYPES, MERITS &DEMERITS

Unit-I **Lesson : 2**

STRUCTURE

2.1 INTRODUCTION

Research methods are of utmost importance in a research process. They describe the various steps of the plan of attack to be adopted in solving a research problem, such as the manner in which the problems are formulated, the definition of terms, the choice of subjects for investigation, the validation of data-gathering tools, the collection analysis and interpretation of data, and the processes of inferences and generalizations.

Research methods may be classified on three basic categories;

1. *Historical Method*: Which provides a method of investigation to discover describe and interpret what existed in the past.

2. *Descriptive Method*: Which provides a method of investigation to duty, describe and interpret what exists at present.

3. *Experimental Method*: Which provides a method of investigation to five basic relationship among phenomena under controlled conditions of more simply, to identify the conditions underlying the occurrence of a then phenomenon.

The selection of a method and the specific design within that method appropriate in investigating a research problem will depend upon the kind data that the problem entail. However, the method selected should be in harmony with scientific principles and adequate enough to lead to dependable generalization. In any specific study, although it is a common practice are any one of the above methods yet there is no reason why two or the methods cannot be applied effectively in combination in certain such situations. For example a researcher may seek the solution of a problems by studying its history through an examination of documents and then determining, its present status by some sort of survey.

A researcher must have a thorough understanding of all researcher methods with particular reference to their strengths, limitations, applicability and appropriateness. It will help him to carefully plan the steps he will take in the research process and describe the method clearly before be actually starts working on the solution of the problem. A pre-planned and well-described method will provide the researcher a scientific and feasible plan for attacking and solving the problem under investigation. In this lesson you wil be acquainted with the various steps that a researcher will use while using historical research as a method for research.

2.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :

Explain the concept of historical research
Differentiate between history and historical research
Describe the nature of historical research
Explain the value of historical research in education
Explain the types of historical research
Describe the steps in historical research
Elucidate the merits and demerits of Historical research

2.3 CONCEPT OF HSITORICAL RESEARCH

History is a meaningful and an organised record of past events. It is not merely a list of events arranged chronologically, but a valid integrated account of social, cultural, economic and

political forces that had operated simultaneously to produce a historical event. Education too, has a history of its own which has progressed under the influence of such forces that had operated simultaneously to produce a historical event. Education too, has a history of its own which has progressed under the influence of such forces. An understanding of the historical background of education would enable the educator to recognize the ills of most educational practices which were tried in the past and found wanting.

NATURE OF HISTORICAL RESEARCH

Historical research attempts to establish facts so as to arrive at conclusion concerning past events. This is usually accompanied by an interpretation of these events and of their relevance to present circumstances and who might happen in the future. The main purpose of historical research therefore, is to arrive at an accurate account of the past so as to gain a clear perspective of the present. This knowledge enables us at least partially to predict and control our future existence. Historical research as any other type of research, includes the delimitation of a problem, formulating hypotheses or tentative generalization gathering and analyzing data, and arriving at conclusions or generalization based upon deductive-inductive reasoning. However, the historian face greater difficulties than researchers in any other field. He according to a Ary et al (1972,p.283), lacks control over both treatment and measurement of data, has relatively little control over sampling, and has no opportunity for replication. The historian handles data of unique type. They are mainly traces of past events in the form of documents, relics, records etc. having a direct or indirect impact on the event under study.

The job of the historian becomes more complicated when he derives truth from historical evidence. The major difficulty lies in the fact that the data on which historical research is based are invariably relatively inadequate and at times the study is conducted with all of the independability that the data may entail. According to best (1977, p.344):

The historian must depend upon the reported observation of others, often witnesses of doubtful competence and sometimes of doubtful objectivity.

These obviously pose difficulty in matters of objectivity of interpretation.

The data of occurrence of a certain historical event is another difficulty it may be difficult to determine it partly because of changes brought out in the system of calender and partly due to incomplete information.

2.3.1 CHECK YOUR PROGRESS 1

Write your answer in the space given below:

Q1. Explain the concept of Historical Research in your own words.

Q2. Discuss the nature of Historical Research .

2.4 STEPS IN HISTORICAL RESEARCH

The steps involved in undertaking a historical research are not different from other forms of research, but the nature of the subject matter presents a researcher some peculiar problems and requires him a apply some special standards and techniques. In general, historical research involves the following steps.

1. Selection of the problem
2. Formulation of hypotheses
3. Collection of data
4. Criticism of data
5. Interpretation and reporting of findings

Selection of the Problem

In the process of selection of a problem a researcher may select a problem pertaining to the history of individuals, institutions, organizations, law, curriculum, administration, textbooks, teacher education, equipment, important concepts and thoughts that have influenced education during a specific period of time in a given nature of sub-culture determined by religion caste, sex, age or work. He may delimit his study to an era of events in a local, regional, or national setting, or he may study the trend of events in different areas, different cities or different cultures. The historian may discover new knowledge, the meaning of which, when interpreted will provide answers about past events. Sometimes he may doubt an old Interpretation of existing data and then attempts to provide a more satisfactory explanation of past events.

The researcher should exercise due care in selecting and delimiting the historical problem for investigation. He should check that the problem selected should not only be of historical and current significance but answerable by available method of research and by the available sources of data. Sometimes many worthwhile topics of historical importance may have to be discarded when adequate data are not available.

Formulation of Hypotheses

The hypotheses that the researcher constructs for historical research are useful in explaining events, condition or phenomena of the historical period in question. Sometimes it is argued that in such type of studies a researcher is merely interested in concrete events in their singularity, he has merely to check the validity and authenticity of facts about past events and arrange them in a chronological sequence. Therefore, the researcher may not formulates any hypotheses in such investigation. But the finding based on unstated hypotheses are ambiguous and do not explain or describe the structural interrelations of the phenomena under study. The reports of such findings relate what happened in the past but do not explain how and why the events occurred in a particular sequence.

However, it must noted that the hypotheses for historical research may not be formal hypotheses to be tested. Rather, they are written as explicit statements that tentatively explain the occurrence of events and conditions.

While formulating hypotheses, a researcher may formulate question that are most appropriate for the past events he is investigating and then directs his research towards seeking answers to these questions with the help of evidences.

Collection of Data

After the problem has been selected and stated and appropriate hypotheses or question have been formulated the researcher has to collect all the data available so that hypotheses may be thoroughly verified. The collection of data in historical research is a tedious and time consuming process. The researcher usually sifts through the vast material of human activity that testify about past events and from these he identifies and selects data that are relevant to his problem. These data are classified into primary and secondary sources. It is important for a researcher to distinguish between them and develop skill in locating them. The detailed explanation about primary and secondary sources will be discussed in the next chapter.

Criticism of data

After the data have been identified, the researcher must learn to read them correctly as a basis for developing sound ideas of the past, which in turn may help in interpreting present trends and possibly in predicting future events. For this his researcher subjects his data to rigorous evaluation, which is known as criticism of the data. It involves the dual processes of establishing the authenticity of the source and of establishing the validity of its contents.

The process of establishing authenticity of the data is termed as external criticism and that of establishing the validity of their content is turned as internal criticism. The process of external criticism and internal criticism will be elaborately discussed in the next chapter.

Interpretation of Data

After the data have been collected and criticized, the researcher turns himself to the task of interpretation of these data in the light of his problem. Because of the unique nature of the historical data, the task of interpretation becomes complicated and acquires special significance. It requires greatest ingenuity and imagination on the part of the researcher.

Writing of the Research Report

After the data have been interpreted, the research has to write a well-organized report of his study. The report of the historical research includes a statement of the problem, a review of the literature, the statement of the objectives and research questions, survey and sources of data and method of its collection organization of heads of classification and ordering of data, the criticism, analysis and interpretation of data, the conclusions reached and a bibliography. The writing of historical research report needs the highest level of scholarship on the part of the researcher. This is a matter of expositional strategy which calls for creativity in addition to the qualities of imagination and ingenuity. The researcher must be elegant and objective in his style of writing the research report. However because of the discontinuous and incomplete nature of historical data on which valid generalizations can be established it is generally accepted that in writing of historical research report, the researcher has to be permitted a little more freedom on the subjective interpretation of data. At the same time, it must be ensured that the presentation is sufficiently systematic and does not hide or distort

the truth.

Self Assessment Questions

1) A researcher may select a problem pertaining to the history of individuals during a specific period.

(True/False)

2) The hypothesis for historical research are written as explicit statements that tentatively explain the occurrence of events. (True/False)

3) Writing of the Research Report is not important in historical research. (True/False)

4) The researcher should not exercise due care in selecting and delimiting the historical problem for investigation. (True/False)

Answers

(1) True (2) True (3) False (4) False

2.5 TYPES OF HISTORICAL RESEARCH

Education has a history that needs to be studied in scholarly detail. Historical studies that could be conducted with profit to the field of education may include the following:

1. Bibliographic research.
2. Legal research.
3. Studying the history of ideas.
4. Studying the history of institutions and organizations.

Bibliographic Research

Bibliographic research aims at determining and presenting truthfully the important facts about the life, character, and achievements of important educators. In Indian context one may study the contribution of Gandhiji, Tagore and other leading educationists and their influence on current educational practice and thought.

Legal Research

Legal research is of immense value and interest to educational administrators. It aims to study the legal basis of educational institutions run by different religions and castes, relation between central and state governments with regard to education, legal status of teachers and

students, administration of private aided schools, school finance, participation of students in the administration of universities, etc. Legal research needs official training in the field of law, and any one without this training is not competent to do this type of research.

Studying the History of ideas

Studying the history of ideas involves the tracing of major philosophical or scientific thoughts from their origins through their different stages of development. It also aims at tracing of changes in popular thoughts and attitudes over a given period of time. The evolution of current concepts like team teaching, the problem-solving approach, mastery-learning approach, etc. provide important topics of historical research.

Studying the History of institutions and Organizations

Studying the history of some prominent schools, universities and other educational institutions also provide numerous problems for significant historical research. When studying such history, the same general method applies as for the study of an educator's life. In India for example, one may study the history of the growth and development of Vishwa Bharti University.

Activity
Make a list of some research studies where the researcher has used historical method as an investigation tool. Also justify the choice that you have selected for the study.

2.6 Merits of Historical Research

Historical research has great value in the field of educational research because it is necessary to know and understand educational achievements and trends of the past in order to gain perspective on present and future directions. Knight (1934), as quoted by good, Barr and scates (1941,p.41) has given the following analysis of the value of historical research:

- A knowledge of the history of schools and other educational agencies is an important part of the professional training of the teacher or the school administrator.
- This knowledge helps in understanding of dynamics of educational change.
- It develops increased understanding of the relationship between education and the culture in which it operates.
- It is useful in making inquiry into the past and reconstruct it.
- Only in the light of their origin and growth can the numerous educational problems of the present be viewed sympathetically and without bias by the teacher, their school administrator, or the public.

- The history of education shows how the functions of social institution shift and how the support and control of education have changed from very simple and local arrangements to those that are now somewhat centralized and complex.
- The history of education in an ally in the scientific study of education rather than a competition. It serves to present the educational ideals and standards of other times, and it enables social workers to avoid mistake of the past.
- It inspires respect for sound scholarship and reverence for great teachers.
- It helps us to develop increased understanding of contemporary educational problems.
- It helps to shed light upon present and future trends of events.
- It is useful to test and evaluate the present day notions, facts, theories and generalizations which people hold about the past and
- To plan future action in the light of the past events.

The students and teachers in the discipline of education can develop the following competencies through a study of history and conducting of historical research.

- Understanding of dynamics of educational change
- Increased understanding of the relationship between education and the culture in which it operates,
- Increased understanding of contemporary educational problems.
- Understanding the functions and limitations of historical evidence in analyzing educational problems.
- Development of elementary ability in locating, analyzing and appraising historical evidence, and
- Development of a sense of dignity and responsibility of the teaching profession.

2.7 Demerits of Historical Research

Historical research suffers from several limitations, some inherent in the very nature of the subject and others extraneous to it and concerning the capabilities required in the researcher. Some of the limitations of this research are enumerated below:

Good historical research is not easy. It is slow, painstaking and exacting. An average researcher finds it difficult to cope with these requirements.

Historical research requires a great commitment to methodological scholarly activity.

Sources of data in historical research, are not available for the direct scrutiny of the researcher and historical evidence is, by and large, incomplete.

The problem of interpretation of data is very complex. There is likely to be a lot of difference in a police officer's and a social worker's understanding and interpretation of a communal

riot.
Through historical research, predictions for the future are difficult to make.
The scientific method which essentially requires the use of the process of observation, hypothesis and experiment cannot be applied to the historical evidence.
The modern electronic aids like computers have not contributed as much to historical and philosophical research as to other empirical research.
Historical research requires a high level of scholarship, language skills and art of writing on the part of the researcher which is generally not available in an average student.
It is not possible to construct 'historical laws 'and 'historical theories' like laws of science and even theories in economics, sociology and psychology.
The man is more concerned with the present and the future and has a tendency to ignore the past as important.
The limitations of historical research are further evident from the following:
A historian can generalize but not predict; can anticipate but not predict; can take precautions but not controls; can talk of possibilities but not probabilities.

_____

2.7.1 CHECK YOUR PROGRESS 2

_____

Note : (a) Write your answers in the space given below.
(b) Compare your answers with those given at the end of the lesson/ above sub-section.
1. Fill in the blanks :
(i) Research methods are of utmost _____ in a research process.
(ii) Name the three basic categories of Research methods –
_____, _____, _____
(iii) History is a meaningful and an _____ record of past events.
(iv) Historical research attempts to establish _____so as to arrive at _____ concerning _____.
(v) _____ is the first step in Historical Research.
2. What is Bibliographic Research ?
_____
_____
3. What is the aim of Legal Research in Educational institutions?
_____
_____
_____

2.8 Let us Sum up

_____

From the above discussion, we conclude that History deals with past and embraces the entire field of the human past. It is as broad as the life itself and its scope is not restricted to only

one aspect or happening in the life of an individual, a group or the whole society. Historical research to a great extent follows the scientific method. However the procedure required in this type of research differs from survey and experimental research. This is obviously due to the fact that the nature of data or facts with which the historical researcher deals is different from those with which the survey researcher or experimenter is concerned. Hence some of the steps in all these types of researches are similar while other, different. The steps involved in Historical research are selection of a broad field , identification of a specific problem, formulation of the problem, selection of sources of historical evidence, collection of historical evidence, interpretation of data and preparation of Report.

2.9 KEY WORDS / GLOSSARY

Historical Research : Method of investigation to discover, describe and interpret what existed in the past.
Descriptive Method : A method of investigation which describe and interpret what exists at present.
Research : A detailed and careful study of a phenomena to acquire more information;
Generalization : Taking one or a few facts and making a broader, more universal statement;
Sampling : Selecting a group for collection of data related to Research problem; A sample refers to a smaller, manageable version of a larger group;
Replication in Research : Repeating a study, or part of a study, to verify the findings of an original investigation ; copy, reproduction: the action or process of reproducing or duplicating ;

2.10 **Self –Assessment Questions**

1. Describe the nature of Historical Research.
2. Describe the value of Historical Research in education.
3. List and describe the types of Historical Research.
4. What considerations should a researcher follow while writing a research report ?
5. Explain various steps conducting a Historical Research in education.

2.11 SUGGESTED FURTHER READINGS

S.S.Mathur “Researcher in Philosophy of Education” in Aggarwal, Y.P.(Edu.) Research in Emerging fields of Education New Delhi: Sterling
H.G.Good “Historical research in Education”
Koul Lokesh; Methodology of Educational Research.
Aggarwal Y.P; The science of Educational Research –A source Book.
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PRIMARY AND SECONDARY SOURCES OF DATA
EXTERNAL AND INTERNAL CRITICISM OF THE SOURCES

Unit I **Lesson No. 3**

STRUCTURE

3.1 NTRODUCTION

In the foregoing chapters we have discussed about meaning and areas of educational research, and the various stages that the researcher has to undergo while planning and conducting a research study. The researcher first selects the area of research, and the various stages that the researcher has to undergo while planning and conducting a research study.

One of the important step for the researcher while conducting the research is collection of data. The researcher usually sifts through the vast materials of human activity that testify about past events, and from these he identifies and selects data that are relevant to his

problem. These data are classified into primary and secondary sources. It is important for a researcher to distinguish between them and develop skill in locating them.

3.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to:

- Explain various forms of data
- Explain the primary sources of data
- Describe the value of secondary sources of data
- Explain the process of criticism of data
- Describe the external criticism of data
- Explain the internal criticism of data

3.3 PRIMARY SOURCES OF DATA

Primary sources are eye witness accounts and are the only solid based of historical enquiry. Good, Barr and Scates (1941, p.253) have collected them as the 'first witnesses to a fact'. The original documents or remains come under the category of primary sources. They are available in written pictorial and mechanical forms as under.

Personal records like certificates, diaries, autobiographies, affidavits, declarations, letters, wills, deed, contracts and original drafts of speeches articles books and pamphlets.

Official records legislative, judicial, or executive documents prepared by central or state government, municipalities, panchayats or other local bodies, such as constitutions, laws, charters, court proceedings and decisions, the data preserved by missionaries and other religious organizations such as financial records and records of the minutes of the meetings of managing or governing bodies; the information compiled by central or state education departments, special commissions, professional organizations, school boards, administrative authorities, such as the minutes of meetings, reports of committees and commissions, administrative orders, school surveys, annual reports ,budget attendance records, cumulative records of dramas, games, musical and athletic events, and examinations.

Oral testimony of traditions and events. Myths, folk tales, family stories, ceremonies, spoken account of a witness of an event, interviews with administrators, teachers, students, parents or guardians, school patrons and prominent educationists.

Pictorial records, photographs, movies, micro-films, drawings, paintings, coins, and sculpture.

Remains or relics. Fossils, skeletons, tools, weapons, clothing, buildings, furniture, utensils, art objects, teaching materials, samples of examination question papers, samples of student

work, and murals .

3.3.1 CHECK YOUR PROGRESS 1

Write your answers in the space given below :

Q1. What do you mean by Primary Sources of data ? Illustrate your answer with examples.

Q2. Differentiate between Personal Records and Official Records.

3.4 SECONDARY SOURCES OF DATA

Secondary sources are the accounts of an event provided by a person who did not directly observe the event, object, or condition. The person may have directly contacted an actual observer and talked with him or read an account by an observer. Since the testimony of the person is not that of an actual participant or observer secondary sources are subject to an informant danger of inaccuracy and distortion. For this reason, the researcher should rely as much as possible on primary sources and use the secondary sources only to bridge the gaps between the various pieces of primary data.

At times however. It is not always possible to obtain primary data and in such situations the researcher may have to rely on secondary sources. These situations, according to Mouly (1963, p.208), are frequent in education where only fragmentary reports concerning the processes of education are available. He is of the opinion that people in the past considered education so trivial that they did not bother recording anything about its nature or its organizations and consequently, it is relatively difficult to identify suitable primary data to permit the conduct of a good historical research in education. The personal documents as diaries and personal letters also leave wide gaps for the researcher to get the required continuity without resorting to secondary sources.

Secondary sources if used carefully, serve many useful purposes. They may acquaint a researcher to major theoretical issues in his field and to the work that has been done in the area under study. They may suggest possible solutions of the problem and working

hypotheses and may introduce the researcher to important primary sources.

A rigid classification of source material is not always possible and practicable. Some type of data may be primary sources for some purposes and secondary source for another. For example, a high school textbook in Indian history will be classified ordinarily a secondary source. But if one making a study of the changing emphasis on national integration in high school history textbooks, the book would be a primary source of data.

In the location of source materials in historical research, the card catalog, periodical indexes, bibliographies, historical reviews, research journals provide helpful guides.

Activity

Check whether the following are primary sources of data (P) or Secondary sources of data (S) :

1) Original drafts of speeches (P) (S)

2) In the location of source materials in historical research, the historical reviews are (P) (S)

3) Pictorial records like photographs etc. (P) (S)

4) Oral testimony of traditions and events like myths and folk tales are (P) (S)

ANSWERS

(1) P (2) S (3) P (4) P

3.5 CRITICSM OF THE DATA

After the data have been identified, the researcher must learn to read them correctly as a basis for developing sound ideas of the past, which in turn may help in interpreting present trends and possibly in predicting future events. For this the researcher subjects his data to rigorous evaluation, which is known as criticism of the data. It involves the dual processes of establishing the authenticity of the source and of establishing the validity of its contents.

The process of establishing authenticity of the data is termed as external criticism and that of establishing the validity of their content is turned as internal criticism.

3.6 EXTERNAL CRITICISM OF DATA

External criticism, also called as lower criticism, checks the genuine ness and authenticity of the source material. It helps to determine whether it is what it appears or claims to be and

whether it reads true to be original so as to save the researcher from being the victim of a fraud. The purpose of external criticism according to Mouly (1963,p.210), is, however, not so much 'negative' that is, the detection of fraud-as it is the establishment of historical truth. To determine the genuineness of the historical data, a researcher must possess a rich fund of historical and general knowledge. According to Vandalen (1973,p.168) he also needs 'a good chronological sense, a versatile collect, good common sense, an intelligent understanding of human behaviour, and good plenty of patience and persistence'. The problem of establishing age or authorship of a document may involve such techniques as authentication of signatures, handwriting, script and type; chemical analysis of paint, carbon dating of artifacts, ink, paper, cloth, stone, metals or wood. The researcher, therefore must be familiar with chemistry, archeology, cartography, art, literature, philology, anthropology, paleography, or various modern and ancient languages. If he does not have a knowledge of these fields, he may acquire special training in the fields that are most closely related to his historical problem or may seek the help of impotent experts in the field.

3.7 INTERNAL CRITICISM OF DATA

After the authenticity of his historical data has been established, the researcher proceeds to internal criticism. It is also called as higher criticism and is concerned with the validity, credibility, or worth of the content of the document. Besides the textual criticism, it also involves such factors as competence, good faith, bias and general reputation of the author. Internal criticism is positive in nature when the researcher seeks to discover theliteral and the real meaning of the text. It is negative when the researcher to seek every possible reason for disbelieving the statement made, questioning critically the competence, truthfulness or accuracy, and honesty of the author. Good Barr and Scates (1941,p.262)are of the opinion the both positive and negative criticism are essential in historical research but the researcher should not go so far as to be cynical and hypercritical.

The competence and accuracy of an author is evaluated in relation to his status as a trained eye witness, presence of emotional stress or pressure that might influence the observation and the extent to which the conditions for observing were favourable. It is also evaluated in terms of the time period that has elapsed between the event and its recording by the author so as to ascertain whether the author was able to remember accurately the account of the event.

The author of a documents may know the truth, but for certain reason he may report the evidence only in part or in a distorted form. Distortion of the fact may result from author's motive, bias or prejudice. It may also result from his personal vanity or ambition, literary artifice, known ignorance about the subject, known weakness of telling lies or half-truths, desire to flatter his superiors, desire to please the public, political or religious views or vested interest

The validity of a historical fact contained in a document can sometimes be evaluated by comparing it with the statements of their author. When there is disagreement among authors,

the researcher must establish which one is correct. This he must do on the basis of overall credibility reputation, independent authentication and general consistency with other known facts.

3.7.1 CHECK YOUR PROGRESS 2

Note : (a) Write your answers in the space given below.
(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. Fill in the blanks :-

(a) Sources of historical evidence may be classified as _____ and _____.

(b) In educational research text books and note books used by the students as long as preserved in original can be classified as _____.

(c) Those persons which were not direct observers in the events of the past are _____.

(d) The researcher subjects his data to rigorous evaluation, which is known as _____criticism of the data.

(e) External criticism checks the _____ and _____ of the source material.

2. What do you mean by criticism of data ?

_____
_____

3. Name various primary sources of data.

_____
_____
_____

3.8 LET US SUM UP

From the above discussion, we conclude that the researcher has to identify and select data through the vast materials of human activity relevant to his problem. The data he has to go through may be in the form of physical remains like roads, buildings etc. or orally transmitted material, or hand-written material etc. of the past events. The sources that he identifies may be primary sources or secondary sources. A primary source is the written or oral testimony of an eyewitnesses or a participant, or a record made by some mechanical device present at the event. Secondary sources are those persons, objects and documents which were not direct observers or participants in the events of the past.

The historical data for evidence collected by the historian must be subjected to a critical and evaluative analysis which is termed as historical criticism. Historical criticism is of two types- external criticism and internal criticism. External criticism is concerned with the establishment of the authenticity or genuineness of the document or relic. After the

authenticity of the document has been established, it is put to internal criticism. Internal criticism deals with the meaning and trustworthiness of the statements contained in the document. Thus the process of establishing authenticity of the data is termed as external criticism and that of establishing the validity of their content is termed as internal criticism.

3.9 KEY WORDS / GLOSSARY

Primary sources : Eye witness records ; original documents or remains .
Relics: An object, tradition etc. from the past that still survives today e.g. fossils .
Oral Testimony: Evidence presented verbally; spoken account of a witness of an event.
Secondary Sources : The material that interpret, analyze or comment on primary sources ; the accounts of an event provided by a person who did not directly observe the event, object or condition

3.10 **Self –Assessment Questions**

1. How is Historical evidence validated in historical research?
2. Explain by giving examples, the primary and secondary sources of data.
3. Describe the process of external and internal criticism of historical data.

3.11 SUGGESTED FURTHER READINGS

H.G.Good “Historical research in Education”
S.S.Mathur “Researches in philosophy of Education” in Aggarwal, Y.P.(Edu.) Research in Emerging fields of Education New Delhi : Sterling
Koul Lokesh; Methodology of Education Research
Aggarwal Y.P; the science of Educational Research ,A source Book.

DESCRIPTIVE RESEARCH
(CONCEPT,STEPS, MERITS AND DEMERITS)

Unit I **Lesson ; 4**

STRUCTURE

4.1 INTRODUCTION

Human knowledge as it exists today broadly consists of facts and theories. New facts, new concepts and new ways of doing things increased its quantum with the passage of time. This knowledge enables us to understand, comprehend, explain, control, predict or cope with a given situation. The sources from which we obtain knowledge range from unreliable to reliable. The reliable knowledge is based on objective verification of generalizations. The acquisition of knowledge requires constant and planned effort by intelligent and highly trained people. The present level of knowledge is an outcome of the various researches conducted and various methods adopted by man over a period of several centuries.

The choice of the method of research is determined by the nature of the problem. Historical method can tell us much about what existed in the past by determining, evaluating and understanding past events. Descriptive methods can tell us about what exists at present by determining the nature and degree of existing conditions. Because of the methods apparent case and directness, descriptive method has undoubtedly been the most popular and most widely used research method in education.

4.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :

- Explain the nature of descriptive research
- Describe the value of Descriptive Research in Education
- Enumerate the steps of Descriptive Research
- List and describe the various types of Descriptive Research
- Describe the nature of survey studies
- Explain the nature of co-relation studies
- Describe the nature of causal comparative studies

4.3 NATURE OF DESCRIPTIVE RESEARCH

Descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and, whenever possible, to draw valid general conclusions from the facts discovered. Descriptive studies are more than just a collection of data; they involve measurement, classification, analysis, comparison, and interpretation. They collect and provide three types of information; (1) of what exists with respect to variables or conditions in a situation; (2) of what we want by identifying standards or norms with which to compare the present conditions or what experts consider to be desirable, and (3) of how to achieve goals by exploring possible ways and means on the basis of the experience of others or the opinions of experts.

The activities of descriptive studies researchers are not different from those of the other researchers. As in any study they (1) identify and define their problem ; (2) state their objectives and hypotheses; (3) list the assumptions upon which their hypotheses and procedures are based; (4) choose appropriate subjects and source materials ;(5) select or construct tools for collecting data; (6) specify categories of data that are relevant for the purpose of study, and capable of bringing out significant similarities, differences, or relationships; (7) describe, analyze and interpret their data in clear and precise terms; and (8) draw significant and meaningful conclusions.

Descriptive studies investigate phenomena in their natural setting. Their purpose is both immediate and long range. They constitute a primitive type of research and do not aspire to develop an organized body of scientific laws. Such studies, however, provide information useful to the solution of local problems and at times provide data to form the basis of research of a more fundamental nature.

4.4 VALUE OF DESCRIPTIVE RESEARCH IN EDUCATION

The descriptive research method has undoubtedly been the most popular and the most widely

used research method in education. It helps to explain educational phenomena in terms of the conditions or relationships that exist, opinions that are held by the students, teachers, parents and experts, processes that are going on, effects that are evident, or trends that are developing. Because of the apparent case and directness of this method, a researcher can gather information in terms of individual's opinion about some issue, by a simple questionnaire. At times, descriptive survey is the only means through which opinions, attitudes, suggestions for improvement of educational practices and instruction, and other data can be obtained.

The descriptive investigations are of immense value in solving problems about children, school organization, supervision and administration, curriculum, teaching methods and evaluation. There are a number of questions that arise concerning theses aspects of education. For example, the head of a school may wish to know how other school systems are being run, so that he can compare his practices with theirs. This way he will be able to know what procedures and standards are superior to those of other schools. The teachers will also study the conditions existing in their classrooms and that of other teachers.

The descriptive type of research is useful in the development of data gathering instruments and tools like checklists, schedules, questionnaires and rating scales. It also provides the background ideas and data from which many more refined or controlled studies of casual relations are made.

Activity

Make a list of some research studies where descriptive research is used in solving problems in education. Also justify your answer by reasoning out your choice of selection.

4.5 STEPS OF DESCRIPTIVE RESEARCH

The researcher may adopt the following steps:

Selection of the problem

A researcher may be concerned with conditions or relationships that exist, practices that prevail, beliefs, points of view or attitudes that are held, processes that are going on, effects that are being felt or trends that are developing, and may select the problem accordingly from the area or field in which he is interested.

Statement and Definition of the problem

The researcher must state the problem clearly and identify the variables involved in the study.

Identification of Data

After stating and defining the problem, the next step for the researcher is to list the data to be collected for the study. He has to specify whether the data are of qualitative or quantitative

in nature and whether the data will be collected in the forms of counts, test scores, responses to questionnaires, interviews and so on.

Selection or Development of Tools

The nature of the data to be collected helps the researcher to select the appropriate tools for the study. If the ready- made tools are not available, the researcher has to develop his own tools. Questionnaires, interviews, psychological tests, rating scales, schedules and attitude scales are the most frequently used tools for descriptive research. If the researcher uses ready-made tools, he should satisfy himself about their reliability, validity, and suitability for sample chosen for the study. If the researcher develops his own tools, he should try them out with a small group in order to evaluate them and make modifications if necessary.

Selection of the sample

The researcher must select the sample about which he wishes to seek information using appropriate sampling techniques. The sample selected should adequately represent the population.

Collection of Data

The researcher should specify the practical schedule for gathering the data from the sample selected for the study with the help of appropriate tools.

Analysis and Interpretation of Data

The data collected is quantified in the form of counts, test scores, responses to questionnaires, etc. These are analysed and interpreted with the help of appropriate parametric or non-parametric statistical tests and qualitative techniques.

Writing of the Research Report

It is the last stage in the descriptive research as in any other form of research. The researcher should exercise extreme caution in generalizing conclusions and reporting them with all the limitations of the study.

4..5.1 CHECK YOUR PROGRESS 1

Write your answers in the space given below :

Q1. Explain the value of Descriptive Research in Education.

Q2. Enlist the steps of Descriptive Research. Explain elaborately any three steps of Descriptive Research in your own words.

4.6 Types of Descriptive Research

Descriptive studies have been classified variously by various writers. These classifications mostly range from the survey, which describes the status quo of educational variables, to the correlational study, which investigates the relationships between variables.

Survey studies

Survey studies are conducted to collect detailed description of existing phenomena with the intent of employing data to justify current conditions and practices or to make more intelligent plans for improving them. Survey studies may take different forms depending upon the scope, nature and purpose of the problem under investigation. Their objective is not only to analyze, interpret, and report the status of an institution, group, or area in order to guide practice in the immediate future, but also to determine the adequacy of status by comparing it with established standards.

Survey studies describe and specify the properties of educational phenomena. They include: school surveys, job analysis, public opinion surveys, and social surveys.

School surveys generally is a comprehensive study of existing conditions. Its main purpose is to determine the overall effectiveness of the school programme and suggest improvement where necessary. The scope of school surveys is large and varied. A single comprehensive school surey may be comprised of various parts or constituent surveys. These include: survey testing, school appraisal, status studies, financial studies, curriculum studies and building surveys.

Job analysis- The method of job analysis is generally used in business and industry. In education , it is employed to gather information about the general duties and responsibilities of the teaching, non-teaching and administrative personnel, the specific duties that they perform, their working conditions, the nature and type of their facilities and their status and relationship in the administrative organization. These data help the researchers to get knowledge about the existing practices and conditions of employment, and the competencies and behavioural traits that the personnel possess or should possess to carry out their work effectively and efficiently.

Public opinion surveys- In order to make some important and crucial decisions, industrial, political, educational and other leaders seek knowledge of the public's opinions, attitudes and preferences. In these surveys the researchers usually make use of questionnaires, schedules or interviews to gather data from the selected group or groups following appropriate sampling procedures.

Social surveys – Social surveys are also called community surveys. These surveys are generally undertaken to study health services, employment conditions, causes of juvenile delinquency, housing problems, or caste discriminations. The research tools that are used in this research ae questionnaires, schedules, interviews, rating scales and direct observations etc.

Activity
Prepare the report of any one survey that you have conucted. Also identify whether you have used direct observation(face to face interview) or indirect observation (such as opinions on library services of an institute) to conduct it.

Descriptive Studies and its types

A descriptive study is one that is designed to describe the distribution of one or more variables, without regard, to any causal or other hypothesis. Descriptive studies can be of several types namely case reports, case series, cross-sectional studies and ecological studies. In the first three of these, data are collected on individuals, whereas the last one uses aggregated data for groups.

Case study – is an intensive investigation of a social unit which may be an individual, a family, a school, a group of delinquents, drop outs or any teenage gang. Guidance and counsellors and social workers conduct case studies for diagnosing a particular condition or problem and recommending therapeutic measures. The case studies in general are classified as descriptive research types, they have sometimes been conducted for purpose of hypothesis testing and taken the form of experimental research. The following steps are involved in the conduct of the case study.

- The first step is to determine the present status of the individual or the social unit under investigation through direct observation of measurement.
- The next step is to determine the most probable antecedents of the case and to formulate hypothesis or a set of hypotheses through the knowledge of similar cases.
- The third step is verification of the hypothesis. Here the researcher makes use of the knowledge of the present status and the history of the case.
- After verification of the hypothesis, the next step is directed towards further validation of the diagnosis.
- The last step of the case study is the follow up of the case.

Advantages

- The case study attempts to understand an individual or a unit in depth.
- The case study often provides an opportunity for a researcher to develop insight into basic aspects of human behavior.
- The case study helps the researcher to observe events both within and outside the educational setting in their totality.
- A case study may provide insights that will help a researcher to formulate fruitful hypothesis or a set of hypotheses.

Limitations

- The case study data are subjective.
- Although case study method attempts to examine an individual in depth, it inevitably lacks breadth.
- It is impossible to either confirm or refute through empirical study the findings and results of a particular case study.
- A worthwhile case study can rarely be completed by a single individual.

Self Assessment

1) Case study means single and _____ case studies.
2) Case studies based on any evidence of quantitative and _____ research.
3) _____ is the last step of case study.

ANSWERS
(1) multiple (2) qualitative (3) follow-up

Causal-comparative studies - In some investigations, the researcher attempts to explore not only what a phenomenon is like, but how and why it occurs, In such cases, the aim of the researcher is to compare the likeness and differences among phenomena to discover what factors or circumstances seem to accompany or contribute to the occurrence of certain events, conditions and practices. Causal-comparative studies are employed when a researcher cannot manipulate the independent variable and establish the controls that are required in experiments. If a researcher, for example, wants to study emotional stability, he cannot manipulate the home background, socio- economic stability, he cannot manipulate the home background, socio economic status, or intelligence of children and cannot place children in a situation where all factors are kept constant except one variable which is manipulated to determine what causes a particular type of emotional instability. Rather he selects children who, according to a criterion are emotionally instable and compares them with a group of emotional stable children. After analyzing the data he may be able to identify the factors or conditions associated with the group of emotionally disturbed children and, therefore, present a possible explanation of the underlying causes of the emotional instability.
Causal-comparative method of research is useful in the situations when the experimental method is impractical or costly in time, money and effort. In some situations, ethical considerations may prevent a researcher to use experimentation as a method of investigation.
Limitations of causal comparative studies- This study suffer from some limitations:

- Lack of control is the serious limitation of this method of research.
- It is usually difficult to identify the relevant factors causing a particular condition or phenomenon.
- When a relationship between variables is established, it is difficult to determine which is the cause and which is the effect.
- The classification of subjects into dichotomous groups for the purpose of comparison also presents problems.
- In comparative studies of natural situations, the researcher does not have the same control over the selection of subjects as he has in experimental studies. It is difficult to identify existing groups of subjects who are alike in all respects except for their exposure to one variable.

Correlation studies – Correlation studies are a frequently used types of descriptive research concerned with determining the extent of relationship existing between variables. They are

used to obtain description of existing phenomenon and enable a researcher to ascertain the extent to which variations in one variable are associated with variations in another. The magnitude of the relationship is determined through the use of the coefficient of correlation. The correlation study is relatively easy to design and conduct. It involves the collection of two or more sets of measurement on a sample of subjects and computation of the coefficient of correlation between these sets of measurements. Several types of relationships can hold between the two sets of measurements. The direction of relationship may be positive or negative; the degree of relationship between the variables may vary from perfect, to high, to average, to no relationship; the relationship may be linear or curvilinear.

Ary et al. (1972. P. 302) have pointed that a researcher must consider the following points when interpreting the coefficient of correlation:

A coefficient of correlation is a simple number and it should not be interpreted ass percentage. A correlation coefficient gives a quantitative determination of the degree of relationship between two variables and it does not necessarily indicate a cause and effect relationship between two variables and it does not necessarily indicate a cause-and-effect relationship between them.

_____

4.6.1 CHECK YOUR PROGRESS 2

_____

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

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. State whether the following are True or False.

(a) Descriptive research studies are designed to obtain precise information concerning the current status phenomena (T/F)

(b) Descriptive investigations are not of immense value in solving problems about children. (T/F)

(c) Descriptive type of research is useful in the development of data gathering tools like checklists, questionnaires etc. (T/F)

(d) The comprehensive school survey does not cover the pupil transportation (T/F)

(e) In causal- comparative studies the researcher attempts to explore about the how and why a phenomena occurs. (T/F)

2. Describe the nature of survey studies.

_____

_____

3. List the various types of Descriptive Research in education .

_____

_____

-

_____

4.7 LET US SUM UP

From the above discussion we conclude that Descriptive research studies tell us about what exists at present by determining the nature and degree of existing conditions. These are designed to obtain pertinent and precise information concerning the current status of phenomena and whenever possible to draw valid general conclusions from the facts discovered. Descriptive Research is not directed towards hypothesis testing. These studies investigate phenomena in their natural settings. Descriptive Research differs from other types of research in purpose and scope. Descriptive research studies involve events that have already taken place and are related to a present condition. Descriptive research have been classified variously by various writers which mostly range from the survey, which describe the status-quo of educational variables, to the correlational study, which investigate the relationships between variables. Selection of the problem, statement and definition of the problem, identification of data, selection and development of tools, selection of the sample, collection of data, analysis and interpretation of data and writing of the Research Report are the various steps followed in Descriptive Research.

4.8 KEY WORDS / GLOSSARY

Hypotheses : An idea that is suggested as the possible explanation for something but has not yet been found to be true ; a tentative assumption made in order to draw out and test its logical or empirical consequences

Descriptive investigations : A type of scientific study that focusses on observing, describing or sometimes measuring natural systems.

Sample : a group of people , items or objects taken from a larger population ; a representative part or a single unit from a large whole or group presented for inspection or shown as evidence of quality

Survey : a study of the opinions, behaviour etc.of a group of people.

Analysis : the careful examination of the different parts or details of something.

Interpretation : an explanation or understanding of something.

4.9 Self –Assessment Questions

1. Describe the nature of Descriptive Research.
2. Describe the value of Descriptive Research.
3. List and describe the various types of Descriptive Research.
4. Elucidate the nature of Causal-comparative studies.
5. Explain the nature and purpose of cross-sectional studies.

4.10 SUGGESTED FURTHER READINGS

Cooper, Dan. H. (1946). " Contributions of School Surveys of Educational Administrations" in Encyclopaedia of Educational Research. C.W.Harris, ed. New York : The Macmillan Company . 1960, p. 1212.

Best, John W. (1977), Research in Education, New Delhi; Prentice Hall of India Private Limited.

H.G.Good "Historical research in Education"

S.S.Mathur "Researches in philosophy of Education" in Aggarwal, Y.P.(Edu.) Research in Emerging fields of Education New Delhi : Sterling

Koul Lokesh; Methodology of Education Research

Aggarwal Y.P; the science of Educational Research ,A source Book.

EXPERIMENTAL RESEARCH

Unit – I **Lesson : 5**

STRUCTURE

5.1 INTRODUCTION

Research is one way of collecting and understanding information and finding answers to questions. Research is a way of thinking. The main purpose of research is developing and testing new theories for the enhancement of knowledge. In research we work within a framework of a set of theories, use methods and try to be unbiased and objective. Research is a scientific methodology in a controlled observation and experiments are the basic tool, which gives the status of science to a subject. It is a systematic attempt to study. Experimental research is mainly used in science subjects such as physics, chemistry, medicine, biology etc. Experiment requires two variables, one independent variable and the other dependent variable. It is important that in experimental research the independent variable is manipulated and the effect of manipulation is observed on the dependent variable. When we intend to do research, the first thing we have to do is to decide what research question we want to find answers to. There are various steps through which we just pass in our research journey in order to find the answers to our research questions. Conceptualizing a research design is one of the important steps in planning a research study. The main function of a research design is to explain how we will find answers to the research question.

5.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :-

- Define experimental research

- List and describe the steps which the researcher may adopt in conducting the experimental type of research
- Define Research design
- Describe the functions of research design
- Identify the terms of research design
- List and explain different research designs
- Define Quasi- experimental design
- List and explain the validity of the design
- Define internal and external validity of the design

5.3 NATURE OF EXPERIMENTAL DESIGN

By experiment we refer to that portion of research in which variables are manipulated and their effects upon other variables are studied. The researcher deliberately manipulates some aspect of the experiment in which he is interested. He causes certain things to happen, and he observes how the condition is affected or changed. Although experimentation is the classic laboratory method of physics, chemistry, biology and other sciences, it has been effectively used in non-laboratory educational settings such as the class-room.

Experimental method provides for much control and , therefore, establishes a systematic and logical association between manipulated factors and observed effects. The researcher defines a problem and proposes a tentative answer or hypothesis. He tests the hypothesis and accepts or rejects it in the light of the controlled variable relationship that he has observed.

The early attempts at experimental designs which may be called as classical approach incorporated the manipulation of a single experimental variable as a time, control of all other variable. Fisher introduced experimental concepts and design of far-reaching applications and is said to be the father of modern experimental methods. The contributions of R.A.Fisher in terms of his concept of achieving pre-experimental equation of conditions through random selection of subjects and random assignment of treatments have provided an effective and sound method of conducting-realistic experiments with human beings. His techniques of analysis of variance and co-variance made it possible to study complex interactions through factorial designs.

There are four essential characteristics of experimental research: (i) Control; (ii) Manipulation;

(iii) Observation; and (iv) Replication.

Control- Control is the essential ingredient of experimental method. It refers to the extent to which different factors in an experiment are accounted for. Since more of the factors are accounted for with accuracy and more control is being enforced, the researcher has more confidence that his results are dependable.

Manipulation – Manipulation of a variable is another distinguishing characteristic of

experimental research. It refers to a deliberate operation of the conditions by the researcher.
Observation- In experimental research, the researcher studies the effect of the manipulation of the independent variable on a dependent variable.
Replication- Replication is a matter of conducting a number of sub-experiments within the framework of an overall experimental design. The researcher, instead of comparing a single control case with a single experimental case, makes a multiple comparison of a number of cases of the control group and a number of cases of the experimental group, all within the same experimental framework.

Self assessment Questions

Fill in the blanks

1) Research problem can be stated in the form of _____.

2) The main task of an experimenter is to maximize the _____.

3) Research is a _____ methodology in a controlled setting.

4) _____ design is generally conducted in the laboratory with complete control over all variables and all subjects.

ANSWERS
(1) hypothesis (2) variance (3) scientific (4) Experimental

5.4 STEPS OF EXPERIMENTAL RESEARCH

The steps of the experimental method are not different from those of a scientific method. For the sake of clarification, the major steps may be described as under:
Surveying the literature relating to the problem
For a worthwhile research based on experimentation, the researcher needs to acquire up-to-date information relating to his problem.
Selecting and defining the problem
Experimental research starts with the selection of the problem which is amenable to experimentation. It needs a rigorous logical analysis and definition of the problem in precise terms. The variables to be studied should be defined in operational terms clearly .
Stating of Hypotheses
The stating of problem suggest that an antecedent condition or phenomenon (independent

variable) is related to the occurrence of another condition, phenomenon, event, or effect (dependent variable). To test a hypothesis, the researcher attempts to control all the conditions except the independent variable which he manipulates.

Constructing the Experimental Plan

Experimental plan refers to the conceptual framework within which the experiment is conducted.

5.4.1 CHECK YOUR PROGRESS 1

Write your answers in the space given below :

Q1. Explain the nature of Experimental Design in your own words.

Q2. Enumerate the steps of Experimental Research .

5.5 EXPERIMENTAL RESEARCH DESIGN

An experimental design is to the researcher what a blueprint is to an architect. It provides the researcher an opportunity for the comparisons required by the hypotheses of the experiment and enables him to make a meaningful interpretation of the results of the study with the help of statistical analysis of the data.

Based on the presence, absence and the amount of controls possible the experimental DESIGNS can be classified as follows.

Pre-Experimental Designs

Pre-experimental Designs provide little or no control of extraneous or situation variables. They are however, still being used in the study of educational problems.

One Group Pre-test Post –test Design

When an experimenter uses this design, he measures dependent variable, before the independent variable X is applied or withdrawn and then takes its measurement again afterwards. The difference in the measurements of dependent variable, if any, is computed and is taken as the amount of change as a result of the application or withdrawing of independent or treatment variable.

PARADIGM FOR THE DESIGN 1: One Group Pre-test Post Design

Pre Test	Independent variable	Post test
T1	X	T2

Mean of the criterion test	Teaching through programmed instruction	Mean of the criterion test

Limitations

Since the design involves only one group and one teacher, it seems to control inter subject differences and extraneous variables. The control, however, is superficial and does not check the threats to internal validity.

True- Experimental Designs

Campbell and Stanley recommends the following experimental design which is powerful enough to control most of the sources of confounding to great extent.

Pre-test Post-test Control Group Designs

Group	Pre-test	Treatment	Post-test
A (Random)	O1	X	O2
B (Random)	O3		O4

In which R stands for random formation of groups and their random assignment to experimental and control conditions. O1 to O4 denote observations. The randomization process used in the formation of the group and the presence of a comparison group control all the possible threats to the internal validity of the experiment. Hence it is the most widely used design in behavioural sciences research.

The Post-test only Control Group Design

Group	Pre-test	Treatment	Post-test

A (Random)	X	O1
B (Random)		O2

To eliminate the possibility of pre-test and treatment interaction effects, this design drops the pre-testing stage altogether. On the force of the argument that randomization is the best method of ensuring pre-experimental equivalence of the groups, the psychological reasons of "knowing for sure" are discarded with profit. There may be situations in which pre-testing may be impossible or hazardous.

Quasi-Experimental Designs

There are many natural setting in which the researcher can introduce some aspects of experimental designs into his scheduling of the data collection procedures even though he lacks a full control over the scheduling of experimental stimuli. He has no control over the administration of the treatment (The when and to whom of response and the ability to randomize responses). These reasons/research situations can be regarded as quasi-experimental situations because it is unfeasible the design true
experiments but a causal inference is desired. Sometimes the need for stronger external validity is another reason for the use of quasi-experimental research.

The word 'quasi' means 'almost' or 'as if'. Hence, the term 'quasi-experimental design' indicates that these design look "as if they are experimental", or sometime reach "almost a true experimental setting. These can be regarded as closer to true experimental designs when compared with the pre-experimental ones.

Some of the popular quasi-experimental designs are described as follows:

Non-equivalent Pre-test-Post-test Control Group Design

Group	Pre-test	Treatment	Post-test
A (Non-Random)	O1	X	O2
B (Non-Random)	O3		O4

This design is like the true experimental design using a pre-test post-test central group situation but differs in the formation of groups which is non-random and hence non-equivalent in the present case. This design can be further extended by using more than two groups. Suppose three different method of teaching a foreign language are to be compared for efficacy, the experimenter can get hold of three intact classrooms and teach each class by using one of the three methods.

Group	Pre-test	Treatment	Post-

test

A (Non-Random)	O1	X1	O2
B (Non-Random)	O3	X2	O4
C (Non-Random)	O5	X3	O6

There is no control group. However, each group is used as a control for the other group.

The Separate-sample Pre-test Post-test Design

Group	Pre-test	treatment	post-test
A (Random)	O1	(X)	
B (Random)		X	O2

In this design though the group are formed randomly. Group A is measured before the treatment and group B is measured only after the treatment. (X) indicates presentation of X irrelevant to the research question. Though a weak design it has been used extensively in social science experiments. It is also called "simulated before-and-after design". The design lacks control of 'history'.

An extension of the above design is given as follows:

The Separate Sample Pre-test----- Post-test control Group Design

Group	Pre-test	Treatment	Post-test
A (Random)	O1	(x)	
B (Random)		X	O2
C (Random)	O3		
D (Random)			O4

This design also uses groups as a whole or intact groups. There is random assignment

of groups A and B above the dotted lines; similarly below the dotted line. The dotted line shows the non-equivalence of groups above it and those below it.

Time Series Designs

If a group is repeatedly measured before and after the treatment, rather than once before and once after, a different design called Time series Design is created. These designs are especially useful when there are continuous naturally occurring observations of the dependent variable over time and there is a sudden or distinct treatment during the observations. These designs have the advantage of having a series of pre and post-observations to find out the pattern of stability and change more accurately as compared to the pre-test post-test designs. Look at the following time series designs to form an idea of their methodology.

Single-Group Interrupted Time Series Design

Group	Pre-observations	Treatment	Post-Observations
A	O1,O2,O3,O4,O5,O6	X	O7,O8,O9,O10,O11,O12

Control-Group Interrupted Time Series Design

Group	Pre-observations	Treatment	Post-observations
A	O1,O2,O3,O4,O5,O6	X	O7,O8,O9,O10,O11,O12
B	O1,O2,O3,O4,O5,O6	X	O7,O8,O9,O10,O11,O12

In design No.1 there is only one group repeatedly measured six times before and six times after the treatment introduced the time gap between measurement is the same. In design No 2 while the procedure is similar to design No.1, a control group has been added to control for the "history effects", and hence a definite improvement over the first one.

These are basis time series designs. There are however, variations of the same. We can have more than two groups and multiple treatments to compare. The experimenter instead of introducing the treatment may withdraw some already occurring phenomenon.

The choice of design will depend on the variables to be studied, the circumstances and setting

available, and the claims of the plausible rival hypotheses, and the extent of control the experimenter desires, and can actually muster.

Self assessment

1) The subjects in experimental research are _____.

2) The experimental subjects are in _____ conitions.

3) The experiment is always _____ in terms of results.

4) The experiment is _____.

5) One experimental group is taken and subjected to the manipulation of the _____ variable
(intervention) and see the effects of it on the subects of the _____ group.

ANSWERS
(1) homogeneous (2) controlled (3) quantitative (4) replicable. (5) independent, experimental

5 .6 INTERNAL AND EXTERNAL VALIDITY OF RESULTS IN EXPERIMENTAL RESEARCH

Validity

Validity refers to the degree to which a test measures, what it claims to measure. It is very necessary for a test to be valid for its proper administration and interpretation.

Internal Validity

Internal validity is the most fundamental type of validity because it concerns the logic of the relationships between the independent variable and dependent variable. This type of validity is an estimate of the degree to which inferences about causal relationship can be drawn, based on the measures employed and research design. Properly suited experimental techniques, where the effect of an independent variable upon the dependent one is observed under highly controlled conditions makes possible higher degree of internal validity.

Threats to Internal Validity

These include (i) confounding, (ii) selection bias, (iii) history, (iv) maturation, (v) repeated testing, (vi) instrument change, (vii) regression towards the mean, (viii) mortality , (ix) diffusion, (x) compensatory rivalry, (xi) experimenter bias.

(i) Confounding – confounding error that occurs when the effect of two variables in an

experiment cannot be separated, resulting in a confused interpretation of the results.
(ii) Selection bias – Any bias in selecting a group can undermine internal validity. Selection bias indicates the problem that occurs as a result of its existence at the pre-test differences between groups, may interact with the independent variable and thus influence the observed outcome and creates problems.
(iii) History- Events outside the experiment or between repeated measures of dependent variables may influence participants responses, attitudes and behavior during process of experiment, like; natural disasters, political changes etc.
(iv) Maturation- Usually, it happens that subjects change during the course of an experiment or between measurements. Permanent changes (such as physical growth) and temporary changes (like fatigue and illness) may alter the way a subject would react to the independent variable.
(v) Repeated testing- Participants may be driven to bias owing to repeated testing. Participants may remember correct answers or may be conditioned as a result of incessant administration of the test.
(vi) Instrument change – If any instrument is replaced/changed during process of experiment, then it may effect internal validity as alternative explanation easily available.
(vii) Regression towards the mean- During the experiment, if subjects are selected on the basis of extreme scores, then there are chances of occurrence of such an error.
(viii) Mortality- It should be kept in mind that there may be some participants who may have dropped out of the study before its completion. If dropping out of participants leads to relevant bias between groups, alternative explanation is possible that account for the observed differences.
(ix) Diffusion – It might be observed that there will be a lack of differences between experimental and control groups if treatment effects spread from treatment groups to control groups. This, however, does not mean that, independent variable will have no effect or that there would not be a no relationship between dependent and independent variable.
(x) Compensatory rivalry - There will be a change in the behavior of the subject if the control groups alter as a result of the study.
(xi) Experimenter bias : Experimenter bias happens while experimenters, without any intention or reluctance, behave differently to the participants of control and experimental groups, that in turn affects the results of the experiment. Experimental bias can be reduced by keeping the experimenter from knowing the condition in the experiment or its purpose and by standardizing the procedure as much as possible.

External Validity

According to Mc Burney and White (2007), external validity concerns whether results of the research can be generalized to another situation, different subjects, settings, times and so on. External validity lacks from the fact that experiments using human participants often employ small samples collected from a particular geographic location or with idiosyncratic features. Because of this, it cannot be made sure that the conclusions drawn about cause-effect-relationships are actually applicable to the people in other geographic locations or in the absence of these features.

Threats to External Validity

How one may go wrong in making generalisations, is one of the major threats to external validity. Usually, generalisations are limited when the cause (i.e independent variable) is dependent upon other factors; as a result, all the threats to external validity interact with the independent variable.

a) Aptitude-Treatment-Interaction: The sample might have some features that may interact with the independent variable causing to limit generalizability.

b) Situations : All the situational factors may limit generalisations.

c) Pre- test effects : When the cause-effect relationships can only be found out after the pre-tests are carried out, then, this also tends to limit the generality of the findings.

d) Post-test effects- When cause-effect relationships can only be explored after the post tests are carried out, then this can also be a cause for limiting the generalisations of the findings.

e) Rosenthal Effects – When derivations drawn from the cause- consequence relationships cannot be generalized to other investigators or researchers.

Self Assessment Questions

1) Results cannot be generalized to another situation or population in external validity. (T/F)

2) Dropping out of some subjects before an experiment is completed causing a threat to internal validity. (T/F)

3)Any bias in selecting the groups can enhance the internal validity. (T/F)

4) Internal validity concern the logic of relationship between the independent variable and dependent variable. (T/F)

ANSWERS

(1) False (2) True (3) False (4) True

5.7 VARIABLES IN EXPERIMENTAL RESEARCH

A variable, as the name implies, is something that varies. This is the simplest way of defining a variable.

Webster says that a variable is "a thing that is changeable" or " a quantity that may have a number of different values. " A variable is something that has at least two values; however, it is also important that the values of the variable be observable. Thus, if what is being studied is a variable, it has more than one value and each value can be observed.

Types of variables in experimental research

Independent variable – An independent variable or stimulus variable (as Underwood calls it) is that factor manipulated or selected by the experimenter in his attempt to ascertain its

relationship to an observed phenomenon.

Dependent upon the mode of manipulation, some expets have tried to divide the independent variable into 'Type E' Independent Variable and 'Type S' independent variable (D'Amato, 1970). Type E independent variable is one of which is directly or experimentally manipulated by the experimental and type S independent variable is one which is manipulated through the process of selection only. For example the experimenter wants to study the effect of noise upon the task performance in an industry. Here the IV (Independent Variable) is the noise and the DV (Dependent Variable) is the task performance. He may manipulate the noise by dividing into three categories- continuous noise, intermittent noise and no noise and examine its effects in task performance. Here the noise is being directly manipulated by the experimenter and hence, it constitutes the example of Type- E independent variable. Suppose , for the time being, that the experimenter is interested in answering the question: Is the rate of production dependent upon the age of workers? Age is here the independent variable. For investigating this problem, the experimenter wil have to select groups of workers on the basis of their age in a way by which he can get an appropriate representation from different age groups ranging from say, 16 to 55 years. Subsequently, he will compare the rate of production obtained by each age group and finally, conclude whether or not age is a factor in enhancement of the performance. Hence this constitutes the examples of S-independent variables.

Dependent Variable- A dependent variable is the factor that appears, disappears, or varies as the experimenter introduces, removes or varies the independent variable. (Townsend, 1953). The dependent variable is a measure of the behavior of the subject. The dependent variable is a measure of the behavior of the subject. The dependent variable is the response that the person or animal makes. Here the relationship between independent and dependent variables is studied. The relationship is that of dependence. One variable depends upon the other. Suppose the researcher finds a relationship between meaningfulness of the learning material and speed of learning. Speed of learning then depends upon meaningfulness; the greater the meaningfulness, the faster the learning. The speed of learning is, therefore, called dependent variable; meaningfulness is independent variable. Similarly, rest between work periods is independent variables; output of work is dependent variable. In an experiment one discovers and confirms a relationship between an independent variable and a dependent variable.

Confounding variables – is one that varies with the independent variable. While doing a study if we are not careful then two variables may get combined so that the effect of one cannot be separated from the effect of the other. This is known as confounding. For instance, if a study of the effect of the television viewing on perception of violence is studied and the experimental group contained only adolescents, whereas the control group only adults;, the age of participants would be confounded with the independent variable under study. Confounding makes the conclusions of the study doubtful. It is, therefore, necessary that effort should be made to un-confound the variables.

Univariate variables -'Uni' means 'one', so the data has only one variable (univariate). Univariate data requires to analyze each variable separately. Data is gathered for the purpose of answering a question, or more specifically, a research question. E.g the salaries of workers in a specific industry; the variable in this example is workers salaries.

Univariate data is a term used in statistics to describe data that consists of observations on only one characteristic or attribute. There is only one variable in univariate data. The analysis of univariate data is thus the most basic type of analysis because it deals with only one varable that changes. It is uninterested in causes or relationships, and its primary objective is to explain the data and detect patterns within it.

The main characteristics of univariate data are as follows:

- Univariate data gathers data around a single, random variable. It describes each variable separately.
- Univariate data describes the variable's response pattern.

Bivariate variables – Bivariate is where two variables are observed. One variable here is dependent while the other is independent. For example , the researcher has bivariate data when he/she is studying two variables. These variables are changing and are compared to find the relationships between them. Similarly, if the researcher is studying a group of students to find out their average Math score and their age, there are two variables (Math score and age). So, Bivariate variable is used to compare two sets of data and to discover any relationships between them.

Multivariate variables – Multivariate variables refers to multiple dependent variables that result in one outcome. This means that a majority of our real world problems are multivariate. For example, based on the season, we cannot predict the weather of any given year. Several factors play an important role in predicting the same.

Multivariate analysis encompasses all statistical techniques that are used to analyze more than two variables at once. The aim is to find patterns and correlations between several variables-simultaneously allowing for a much deeper, more complex understanding of a given scenario than with bivariate analysis.

5.7.1 CHECK YOUR PROGRESS 2

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

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. State whether the statement is True or False.

(a) The selection of a problem is the last step of research. ( )

(b) After defining the research problem the hypothesis must be formulated. ( )

(c) Experimental research is used in science subjects ( )

(d) Research problem can be stated in the form of hypothesis. ( )

(e) Experimental design is not generally conducted in the laboratory with complete control over all variables and all subjects . ( )

2. Define experimental research.

_____

_____

3. Define Research design.

_____

_____

_____

_____

5.8 LET US SUM UP

_____

_____

From the above discussion, we conclude that Research is a scientific methodology in a controlled observation and experiments are the basic tools which gives the status of science to a subject/discipline. It is a systematic attempt to study a phenomenon.

Experimental research is based on highly rigorous procedures and aims at producing highly reliable and valid conclusions. It is a systematic and scientific approach to research in which the researcher deliberately manipulates some aspect of the experiment in which he is interested. He causes certain things to happen, and he observes how the condition is affected and changed. The major steps of experimental research are- surveying the literature relating to the problem, selecting and defining the problem, stating the hypothesis and constructing the experimental plan.

When an experimenter intends to do research, the first thing to do is to decide what research question is to be studied. Having decided about the research question or problem the next thing is to decide how to go about finding their answer. There are various steps through which the researcher pass in the research journey in order to find the answers to research questions. Conceptualising a research design is one of the important steps in planning a research study. The main function of a research design is to explain how to find answers to the research question. For any investigation the selection of an appropriate research design is crucial in enabling the researcher to arrive at valid findings and conclusions. In this lesson we have discussed about various experimental designs.

In experimental research the researcher manipulates one or more variables and controls and measures the other variables. A variable is something that varies. Variables are important in bringing clarity and specificity to the conceptualizing of a research problem, to formulation of hypothesis and to the development of the research instrument. Knowledge of different types of variables play a crucial role in research. There are different kinds of variables such as independent variables, dependent variables, confounding variables etc. In this lesson we have also discussed about concept of univariate, bivariate and multivariate variables. The data which has only one variable is univariate variable. Univariate data requires to analyze each variable separately. Bivariate analysis is one of the statistical analysis where two variables are observed. One variable here is dependent while the other is independent. Multivariate refers to multiple dependent variables that result in one outcome. This means that a majority of our real world problems are multi-variable.

_____

_____

5.9 KEY WORDS / GLOSSARY

_____

Research Design : the over all plan of frame work that guides the collection and analysis of data to address a research question.
Validity : the extent to which a study accurately measures what it intends to measure, ensuring that conclusions drawn are sound and applicable to the broader population.
Variables : characteristics that can change or take on different values.
Univariate : a statistical method that examines a single variable at a time focusing on describing its characteristics without considerate relationships with other variables.
Bivariate : the data sets that contain two variables, where each piece of information in the data set has two values associated with it.

5.10 Self –Assessment Questions

1. Define the nature of Experimental research.
2. List and describe the steps which the researcher may adopt in conducting the experimental type of research.
3. Define an experimental design.
4. Define validity of the design.
5. Explain internal validity and external validity of the design.
6. List the various types of Time series designs.
7. Write short notes on :

(a) Independent variable (b) Dependent variable.

5.11 SUGGESTED FURTHER READINGS

Best, John W. (1977), Research in Education, New Delhi; Prentice Hall of India Private Limited.
H.G.Good “Historical research in Education”
S.S.Mathur “Researches in philosophy of Education” in Aggarwal, Y.P.(Edu.) Research in Emerging fields of Education New Delhi : Sterling
Koul Lokesh; Methodology of Education Research
Aggarwal Y.P; the science of Educational Research ,A source Book.

QUANTITATIVE RESEARCH : CONCEPT AND CHARACTERISTICS

Unit –I **Lesson :1**

STRUCTURE

1.1 INTRODUCTION

Students have you observed that human mind is very curious and there is a scientific quest for understanding how it works. We as human beings want to know why we think, feel and behave as we do. What makes individual differences in human beings. Psychologists and educationists as scientists, answer these questions systematically. They develop principles to explain them and use those principles to solve various problems.

Research is a process through which new knowledge is discovered. It is a systematic and objective attempt to provide answers to certain questions. The word research is composed of two syllables, re and search which means to examine carefully and probe deeply to learn. According to (Grinnell 1993) The simplest meaning of research is to search for facts, answers to research question and solution for the problem.

Conducting research requires to follow a sequence of steps. These steps vary with the nature of the problem. The exact sequence and steps vary somewhat with the type of research.

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1.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :

- Explain the concept of Quantitative Research
- Describe the purpose of quantitative Research
- Identify the characteristics of quantitative Research
- Describe the advantages Quantitative Research
- Identify the limitations of Quantitative research

1.3 CONCEPT

Quantitative research is a research strategy that focuses on quantifying the collection and analysis of data. It is formed from a deductive approach where emphasis is placed on the testing of theory. Quantitative research collects information from existing and potential customers using sampling methods and sending out online surveys, on line polls, and questionnaires, e.g. one of the main characteristics of this type of research is that the results can be depicted in numerical form.

Quantitative Research is the process of collecting and analyzing numerical data. It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations.

Quantitative Research is widely used in the natural and social sciences: biology, chemistry, psychology, economics, sociology, marketing etc.

Examples

How has the average temperature changed globally over the last century?

Does working from home increase productivity for people with long commutes?

There are four main types of Quantitative Research, Descriptive, Correlational, Causal-comparative/Quasi-experimental, and Experimental Research, attempts to establish cause-effect relationships among the variables.

1.4 PURPOSE

The purpose of quantitative research is to attain greater knowledge and understanding of the social world. Researchers use quantitative methods to observe situations or events that affect people. Quantitative research produces objective data that can be clearly communicated through statistics and numbers. This is done in a systematic scientific way, so the studies can be replicated by someone else. The data is primarily used to :

- Find patterns and averages
- Make predictions
- Test causal relationships
- Generalize results to wider populations

1.4.1 CHECK YOUR PROGRESS 1

Write your answer in the space given below :

Q1. Explain the concept of Quantitative Research .

Q2. Discuss the purpose of Quantitative Research in your own words.

1.5 CHARACTERISTS

Objective –Quantitative Research seeks accurate measurement and analysis of target concepts. It is not based on mere intuition and guesses. Data are gathered before proposing a conclusion or solution to a problem.

Clearly defined Research Questions – The researchers know in advance what they are looking for. The research questions are well defined for which objective answers are sought. All aspects of the study are carefully designed before data are gathered.

Structured Research instruments – Standardized instruments guide data collection, thus,

ensuring the accuracy, reliability and validity of data. Data are normally gathered using structured research tools such as questionnaires to collect measurable characteristics of the population like age,socio-economic status, numbers of children, among others.

Numerical data – Figures , tables or graphs showcase summarized data collection in order to show trends, relationships or differences among variables. In sum, the charts and tables allow you to see the evidence collected.

Large sample sizes- To arrive at a more reliable data analysis, a normal population distribution curve is preferred. This requires a large sample size, depending on how the characteristics of the population vary. Random sampling is recommended in determining the sample size to avoid researcher's bias in interpreting the results.

Replication – Qualitative methods can be repeated to verify findings in another setting, thus strengthening and reinforcing validity of findings eliminating possibility of spurious conclusions.

Future outcomes- By using complex mathematical calculations and with the aid of computers, if then scenarios may be formulated thus predicting future results. Quantitative Research puts emphasis on proof, rather than the discovery.

Self Assessment Questions

1) An investigator comes up with a new ideas or a different way of thinking is known as context of discovery. (True/ False)
2) Descriptive research is a type of quantitative research. (True / False).
3) Quantitative research puts emphasis on the discovery. (True/False)
4)The correlation study is reltively easy to design and conduct. (True / False)
Answers

(1) True (2) True (3) False (4) True.

1.6 METHODS

Quantitative Research methods can be used for descriptive, correlational or experimental research.

Descriptive Research

Descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and, whenever possible, to draw valid general conclusions from the facts discovered. They are restricted not only to fact finding but may often result in the formulation of important principles of knowledge and solution of significant problems concerning local, state, national and international issues. Descriptive

studies are more than just a collection of data, they involve measurement, classification, analysis, comparison and interpretation. They collect and provide three types of information: (1) of what exists with respect to variables or conditions in a situation (2) of what we want by identifying standards or norms with which to compare the present conditions or what experts consider to be desirable and (3) of how to achieve goals by exploring possible ways and means on the basis of the experience of others or the opinions of experts.

Correlational Research

Correlational studies are a frequently used types of descriptive research concerned with determining the extent of relationship existing between variables. They are used to obtain description of existing phenomenon and enable a researcher to ascertain the extent to which variations in one variable are associated with variations in another. The magnitude of the relationship is determined through the use of the coefficient of correlation. For instance, on the basis of earlier studies a researcher may hypothesize that there is a relationship between performance of an intelligence test and a test of achievement in arithmetic. The correlation technique will help him to test his hypothesis about the relationship between these two variables as well as to assess the magnitude of the relationship. The correlation study is relatively easy to design and conduct. It involves the collection of two or more sets of measurement on a sample of subjects and computation of the coefficient of correlation between these sets of measurements.

Experimental Research

Experimental Method establishes a systematic and logical association between manipulated factors and observed effects. The researcher defines a problem and proposes a tentative answer or hypothesis. The researcher tests the hypothesis and accepts or rejects it in the light of the controlled variable relationship that he has observed.

Experimental Research is mainly used in science subjects such as physics, chemistry, medicine, biology etc. Experiment requires two variables, one independent variable, and the other dependent variable. It is important that in experimental research the independent variable is manipulated and the effect of manipulation is observed on the dependent variable.All other extraneous factors are completely controlled within the laboratory. It is based on research design which uses manipulation and controlled testing to understand the causal processes. Generally, we can manipulate one or more variables to determine their effect on a dependent variable. In other words, it is a systematic and scientific approach to research in which the researcher manipulates one or more variables, and controls and measures the other variables.

John Stuart Mill (1846) stated five canons or rules of experimental research

- The method of agreement
- The method of difference
- The joint method
- The method of residues and
- The method of concomitant variations.

Self Assessment Questions

Fill in the blanks
1) Descriptive research is one of the important methods of _____ research.
2) Correlation studies are concerned with determining the extent of relationship existing between_____.
3) Experimental research studies the relationship between two variables _____ and _____.

Answers
1) Quantitative 2) Variables 3) independent, dependent.

1.7 ADVANTAGES

The advantages of Quantitative Research include the following:

- It is objective. The most reliable and valid way of concluding results, giving way to a new hypothesis or to disproving it. Because of bigger no. of sample of population, the results or generalizations are more reliable and valid. Since it provides numerical data, it can't be easily misinterpreted.
- The use of statistical techniques facilitates sophisticated analyses and allows you to comprehend a huge number of vital characteristics of data.
- It is real and unbiased. If the research is properly designed it fitters out external factors, and so can be seen as real and unbiased.
- The numerical data can be analyzed in a quick and easy way. By employing statistically valid random models findings can be generalized to the population about which information is necessary.
- Quantitative studies are replicable. Standardized approaches allow the study to be replicated in different areas or over time with formulation of comparable findings.
- Quantitative experiments are useful for testing the results gained by a series of qualitative experiments, leading to a final answer, and narrowing down of possible directions to follow.

1.8DISADVANTAGES

Quantitative Research requires a large no. of respondents. It is assumed that the larger the sample is the more statistically accurate the findings are.

It is costly. Since, there are more respondents compared to qualitative research, the expense will be greater in reaching out to these people and in reproducing questionnaires.

The information is contextual. Factors to help interpret the results or to explain variations are usually ignored. It does not consider the distinct capacity of the respondents to share and elaborate further information unlike quantitative research.

Much information is difficult to gather using structured research instruments, specifically on sensitive issues like pre-marital sex, domestic violence among others.

If not done seriously and correctly, data from questionnaire may be incomplete and inaccurate. Researchers must be on the look out on respondents who are just guessing in answering the instrument.

1.8.1 CHECK YOUR PROGRESS 2

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

(b) Compare your answers with those given at the end of the lesson/ above sub-section.

1. Which of the following statements are true :-

a) The first step of research process is identifying a problem. T/F

b) Selection of particular data collection method depends on the nature of study. T/F

c) Purpose of Quantitative research is to attain scientific knowledge. T/F

d) Research is a process through which old knowledge is discovered. T/F

e) To conduct Quantitative research is costly. T/F

2. What do you mean by structured Research instruments?

3. Give any two disadvantages of Quantitative research.

1.9 LET US SUM UP

From the above discussion, we conclude that Research is a careful, systematic, patient study

and investigation in some field of knowledge, undertaken to establish facts or principles. The purpose of research is to discover answers to questions through the application of scientific procedures. The main aim of the research is find out the truth which is hidden and which has not been discovered as yet. Conducting research requires to follow a sequence of steps. The steps vary depending upon the quantitative or qualitative approach.

Quantitative research deals in numbers, logic and an objective stance. Quantitative research focuses on numeric and unchanging data and detailed, convergent reasoning rather than divergent reasoning (i.e the generation of a variety of ideas about a research problem in a spontameous, free-flowing manner). In addition Quantitative research is important because it enables us to conduct research on a large scale; it can reveal insights about broader groups of people or population as a whole; it enables researchers to compare different groups to understand similarities and differences; and it helps business. Quantitative research produces objective data that can be clearly communicated through statistics and numbers. This is primarily done in a systematic scientific way so the studies can be replicated by someone else.

1.10 KEY WORDS / GLOSSARY

Structured : Data organized in a standardized, easily searchable format, often resembling tables with rows and columns ; standardized ; the use of uniform consistent procedures in all phases of data collection.

Replication : Copy; reproduction of the similar phenomena or concept; the action or process of reproducing or duplicating.

Descriptive Research : to obtain pertinent and precise information concerning the current status of phenomena.

Correlation : Determining the extent of relationship existing between variables.

Manipulate : The deliberate alteration of a variable (Independent Variable) by a researcher to observe its effect on another variable(Dependent Variable).

1.11 **Self –Assessment Questions**

Elucidate the concept of Quantitative Research.

Explain the various characteristics of Quantitative Research.

Describe the value of quantitative research in education.

Describe the nature of quantitative research.

1.12 Suggested Further Readings

Koul, Lokesh : Methodology of Educational Research
Aggarwal Y.P; The science of Educational Research
Kumar. R (2006) Research Methodology, New Delhi; Dorling Kingsley
Grinnell, Richard Jr (ed) 1988, social work Research and Evaluation (3rd edition) Itasca, Illinois, F.E.Peacock Publishers

HISTORICAL RESEARCH (CONCEPT, STEPS, TYPES, MERITS &DEMERITS

Unit-I **Lesson : 2**

STRUCTURE

2.1 INTRODUCTION

Research methods are of utmost importance in a research process. They describe the various steps of the plan of attack to be adopted in solving a research problem, such as the manner in which the problems are formulated, the definition of terms, the choice of subjects for investigation, the validation of data-gathering tools, the collection analysis and interpretation

of data, and the processes of inferences and generalizations.

Research methods may be classified on three basic categories;

4. *Historical Method*: Which provides a method of investigation to discover describe and interpret what existed in the past.

5. *Descriptive Method*: Which provides a method of investigation to duty, describe and interpret what exists at present.

6. *Experimental Method*: Which provides a method of investigation to five basic relationship among phenomena under controlled conditions of more simply, to identify the conditions underlying the occurrence of a then phenomenon.

The selection of a method and the specific design within that method appropriate in investigating a research problem will depend upon the kind data that the problem entail. However, the method selected should be in harmony with scientific principles and adequate enough to lead to dependable generalization. In any specific study, although it is a common practice are any one of the above methods yet there is no reason why two or the methods cannot be applied effectively in combination in certain such situations. For example a researcher may seek the solution of a problems by studying its history through an examination of documents and then determining, its present status by some sort of survey.

A researcher must have a thorough understanding of all researcher methods with particular reference to their strengths, limitations, applicability and appropriateness. It will help him to carefully plan the steps he will take in the research process and describe the method clearly before be actually starts working on the solution of the problem. A pre-planned and well-described method will provide the researcher a scientific and feasible plan for attacking and solving the problem under investigation. In this lesson you wil be acquainted with the various steps that a researcher will use while using historical research as a method for research.

2.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :

Explain the concept of historical research

Differentiate between history and historical research

Describe the nature of historical research

Explain the value of historical research in education

Explain the types of historical research

Describe the steps in historical research

Elucidate the merits and demerits of Historical research

2.3 CONCEPT OF HSITORICAL RESEARCH

History is a meaningful and an organised record of past events. It is not merely a list of events arranged chronologically, but a valid integrated account of social, cultural, economic and political forces that had operated simultaneously to produce a historical event. Education too, has a history of its own which has progressed under the influence of such forces that had operated simultaneously to produce a historical event. Education too, has a history of its own which has progressed under the influence of such forces. An understanding of the historical background of education would enable the educator to recognize the ills of most educational practices which were tried in the past and found wanting.

NATURE OF HISTORICAL RESEARCH

Historical research attempts to establish facts so as to arrive at conclusion concerning past events. This is usually accompanied by an interpretation of these events and of their relevance to present circumstances and who might happen in the future. The main purpose of historical research therefore, is to arrive at an accurate account of the past so as to gain a clear perspective of the present. This knowledge enables us at least partially to predict and control our future existence. Historical research as any other type of research, includes the delimitation of a problem, formulating hypotheses or tentative generalization gathering and analyzing data, and arriving at conclusions or generalization based upon deductive-inductive reasoning. However, the historian face greater difficulties than researchers in any other field. He according to a Ary et al (1972,p.283), lacks control over both treatment and measurement of data, has relatively little control over sampling, and has no opportunity for replication. The historian handles data of unique type. They are mainly traces of past events in the form of documents, relics, records etc. having a direct or indirect impact on the event under study.

The job of the historian becomes more complicated when he derives truth from historical evidence. The major difficulty lies in the fact that the data on which historical research is based are invariably relatively inadequate and at times the study is conducted with all of the independability that the data may entail. According to best (1977, p.344):

The historian must depend upon the reported observation of others, often witnesses of doubtful competence and sometimes of doubtful objectivity.

These obviously pose difficulty in matters of objectivity of interpretation.

The data of occurrence of a certain historical event is another difficulty it may be difficult to determine it partly because of changes brought out in the system of calender and partly due to incomplete information.

2.3.1 CHECK YOUR PROGRESS 1

Write your answer in the space given below:

Q1. Explain the concept of Historical Research in your own words.

Q2. Discuss the nature of Historical Research .

2.4 STEPS IN HISTORICAL RESEARCH

The steps involved in undertaking a historical research are not different from other forms of research, but the nature of the subject matter presents a researcher some peculiar problems and requires him a apply some special standards and techniques. In general, historical research involves the following steps.

1. Selection of the problem
2. Formulation of hypotheses
3. Collection of data
4. Criticism of data
5. Interpretation and reporting of findings

Selection of the Problem

In the process of selection of a problem a researcher may select a problem pertaining to the history of individuals, institutions, organizations, law, curriculum, administration, textbooks, teacher education, equipment, important concepts and thoughts that have influenced education during a specific period of time in a given nature of sub-culture determined by religion caste, sex, age or work. He may delimit his study to an era of events in a local, regional, or national setting, or he may study the trend of events in different areas, different cities or different cultures. The historian may discover new knowledge, the meaning of which, when interpreted will provide answers about past events. Sometimes he may doubt an old Interpretation of existing data and then attempts to provide a more satisfactory explanation of past events.

The researcher should exercise due care in selecting and delimiting the historical problem for investigation. He should check that the problem selected should not only be of historical and current significance but answerable by available method of research and by the available sources of data. Sometimes many worthwhile topics of historical importance may have to be discarded when adequate data are not available.

Formulation of Hypotheses

The hypotheses that the researcher constructs for historical research are useful in explaining events, condition or phenomena of the historical period in question. Sometimes it is argued that in such type of studies a researcher is merely interested in concrete events in their singularity, he has merely to check the validity and authenticity of facts about past events

and arrange them in a chronological sequence. Therefore, the researcher may not formulates any hypotheses in such investigation. But the finding based on unstated hypotheses are ambiguous and do not explain or describe the structural interrelations of the phenomena under study. The reports of such findings relate what happened in the past but do not explain how and why the events occurred in a particular sequence.

However, it must noted that the hypotheses for historical research may not be formal hypotheses to be tested. Rather, they are written as explicit statements that tentatively explain the occurrence of events and conditions.

While formulating hypotheses, a researcher may formulate question that are most appropriate for the past events he is investigating and then directs his research towards seeking answers to these questions with the help of evidences.

Collection of Data

After the problem has been selected and stated and appropriate hypotheses or question have been formulated the researcher has to collect all the data available so that hypotheses may be thoroughly verified. The collection of data in historical research is a tedious and time consuming process. The researcher usually sifts through the vast material of human activity that testify about past events and from these he identifies and selects data that are relevant to his problem. These data are classified into primary and secondary sources. It is important for a researcher to distinguish between them and develop skill in locating them. The detailed explanation about primary and secondary sources will be discussed in the next chapter.

Criticism of data

After the data have been identified, the researcher must learn to read them correctly as a basis for developing sound ideas of the past, which in turn may help in interpreting present trends and possibly in predicting future events. For this his researcher subjects his data to rigorous evaluation, which is known as criticism of the data. It involves the dual processes of establishing the authenticity of the source and of establishing the validity of its contents.

The process of establishing authenticity of the data is termed as external criticism and that of establishing the validity of their content is turned as internal criticism. The process of external criticism and internal criticism will be elaborately discussed in the next chapter.

Interpretation of Data

After the data have been collected and criticized, the researcher turns himself to the task of interpretation of these data in the light of his problem. Because of the unique nature of the historical data, the task of interpretation becomes complicated and acquires special significance. It requires greatest ingenuity and imagination on the part of the researcher.

Writing of the Research Report

After the data have been interpreted, the research has to write a well-organized report of his study. The report of the historical research includes a statement of the problem, a review of the literature, the statement of the objectives and research questions, survey and sources of data and method of its collection organization of heads of classification and ordering of data, the criticism, analysis and interpretation of data, the conclusions reached and a bibliography. The writing of historical research report needs the highest level of scholarship on the part of the researcher. This is a matter of expositional strategy which calls for creativity in addition to the qualities of imagination and ingenuity. The researcher must be elegant and objective

in his style of writing the research report. However because of the discontinuous and incomplete nature of historical data on which valid generalizations can be established it is generally accepted that in writing of historical research report, the researcher has to be permitted a little more freedom on the subjective interpretation of data. At the same time, it must be ensured that the presentation is sufficiently systematic and does not hide or distort the truth.

Self Assessment Questions

1) A researcher may select a problem pertaining to the history of individuals during a specific period.

(True/False)

2) The hypothesis for historical research are written as explicit statements that tentatively explain the occurrence of events. (True/False)

3) Writing of the Research Report is not important in historical research. (True/False)

4) The researcher should not exercise due care in selecting and delimiting the historical problem for investigation. (True/False)

Answers

(1) True (2) True (3) False (4) False

2.5 TYPES OF HISTORICAL RESEARCH

Education has a history that needs to be studied in scholarly detail. Historical studies that could be conducted with profit to the field of education may include the following:

5. Bibliographic research.
6. Legal research.
7. Studying the history of ideas.
8. Studying the history of institutions and organizations.

Bibliographic Research

Bibliographic research aims at determining and presenting truthfully the important facts about the life, character, and achievements of important educators. In Indian context one may study the contribution of Gandhiji, Tagore and other leading educationists and their influence

on current educational practice and thought.

Legal Research

Legal research is of immense value and interest to educational administrators. It aims to study the legal basis of educational institutions run by different religions and castes, relation between central and state governments with regard to education, legal status of teachers and students, administration of private aided schools, school finance, participation of students in the administration of universities, etc. Legal research needs official training in the field of law, and any one without this training is not competent to do this type of research.

Studying the History of ideas

Studying the history of ideas involves the tracing of major philosophical or scientific thoughts from their origins through their different stages of development. It also aims at tracing of changes in popular thoughts and attitudes over a given period of time. The evolution of current concepts like team teaching, the problem-solving approach, mastery-learning approach, etc. provide important topics of historical research.

Studying the History of institutions and Organizations

Studying the history of some prominent schools, universities and other educational institutions also provide numerous problems for significant historical research. When studying such history, the same general method applies as for the study of an educator's life. In India for example, one may study the history of the growth and development of Vishwa Bharti University.

Activity
Make a list of some research studies where the researcher has used historical method as an investigation tool. Also justify the choice that you have selected for the study.

2.6 Merits of Historical Research

Historical research has great value in the field of educational research because it is necessary to know and understand educational achievements and trends of the past in order to gain perspective on present and future directions. Knight (1934), as quoted by good, Barr and scates (1941,p.41) has given the following analysis of the value of historical research:

- A knowledge of the history of schools and other educational agencies is an important part of the professional training of the teacher or the school administrator.
- This knowledge helps in understanding of dynamics of educational change.
- It develops increased understanding of the relationship between education and the culture in which it operates.
- It is useful in making inquiry into the past and reconstruct it.

- Only in the light of their origin and growth can the numerous educational problems of the present be viewed sympathetically and without bias by the teacher, their school administrator, or the public.
- The history of education shows how the functions of social institution shift and how the support and control of education have changed from very simple and local arrangements to those that are now somewhat centralized and complex.
- The history of education in an ally in the scientific study of education rather than a competition. It serves to present the educational ideals and standards of other times, and it enables social workers to avoid mistake of the past.
- It inspires respect for sound scholarship and reverence for great teachers.
- It helps us to develop increased understanding of contemporary educational problems.
- It helps to shed light upon present and future trends of events.
- It is useful to test and evaluate the present day notions, facts, theories and generalizations which people hold about the past and
- To plan future action in the light of the past events.

The students and teachers in the discipline of education can develop the following competencies through a study of history and conducting of historical research.

- Understanding of dynamics of educational change
- Increased understanding of the relationship between education and the culture in which it operates,
- Increased understanding of contemporary educational problems.
- Understanding the functions and limitations of historical evidence in analyzing educational problems.
- Development of elementary ability in locating, analyzing and appraising historical evidence, and
- Development of a sense of dignity and responsibility of the teaching profession.

2.7 Demerits of Historical Research

Historical research suffers from several limitations, some inherent in the very nature of the subject and others extraneous to it and concerning the capabilities required in the researcher. Some of the limitations of this research are enumerated below:

Good historical research is not easy. It is slow, painstaking and exacting. An average researcher finds it difficult to cope with these requirements.

Historical research requires a great commitment to methodological scholarly activity.

Sources of data in historical research, are not available for the direct scrutiny of the researcher

and historical evidence is, by and large, incomplete.
The problem of interpretation of data is very complex. There is likely to be a lot of difference in a police officer's and a social worker's understanding and interpretation of a communal riot.
Through historical research, predictions for the future are difficult to make.
The scientific method which essentially requires the use of the process of observation, hypothesis and experiment cannot be applied to the historical evidence.
The modern electronic aids like computers have not contributed as much to historical and philosophical research as to other empirical research.
Historical research requires a high level of scholarship, language skills and art of writing on the part of the researcher which is generally not available in an average student.
It is not possible to construct 'historical laws 'and 'historical theories' like laws of science and even theories in economics, sociology and psychology.
The man is more concerned with the present and the future and has a tendency to ignore the past as important.
The limitations of historical research are further evident from the following:
A historian can generalize but not predict; can anticipate but not predict; can take precautions but not controls; can talk of possibilities but not probabilities.

2.7.1 CHECK YOUR PROGRESS 2

Note : (a) Write your answers in the space given below.
(b) Compare your answers with those given at the end of the lesson/ above sub-section.
1. Fill in the blanks :
(i) Research methods are of utmost _____ in a research process.
(ii) Name the three basic categories of Research methods –
_____, _____, _____
(iii) History is a meaningful and an _____ record of past events.
(iv) Historical research attempts to establish _____so as to arrive at _____ concerning _____.
(v) _____ is the first step in Historical Research.
2. What is Bibliographic Research ?
_____
_____
3. What is the aim of Legal Research in Educational institutions?
_____
_____

2.8 Let us Sum up

From the above discussion, we conclude that History deals with past and embraces the entire field of the human past. It is as broad as the life itself and its scope is not restricted to only one aspect or happening in the life of an individual, a group or the whole society. Historical research to a great extent follows the scientific method. However the procedure required in this type of research differs from survey and experimental research. This is obviously due to the fact that the nature of data or facts with which the historical researcher deals is different from those with which the survey researcher or experimenter is concerned. Hence some of the steps in all these types of researches are similar while other, different. The steps involved in Historical research are selection of a broad field , identification of a specific problem, formulation of the problem, selection of sources of historical evidence, collection of historical evidence, interpretation of data and preparation of Report.

2.9 KEY WORDS / GLOSSARY

Historical Research : Method of investigation to discover, describe and interpret what existed in the past.
Descriptive Method : A method of investigation which describe and interpret what exists at present.
Research : A detailed and careful study of a phenomena to acquire more information;
Generalization : Taking one or a few facts and making a broader, more universal statement;
Sampling : Selecting a group for collection of data related to Research problem; A sample refers to a smaller, manageable version of a larger group;
Replication in Research : Repeating a study, or part of a study, to verify the findings of an original investigation ; copy, reproduction: the action or process of reproducing or duplicating ;

2.10 **Self –Assessment Questions**

1. Describe the nature of Historical Research.
2. Describe the value of Historical Research in education.
3. List and describe the types of Historical Research.
4. What considerations should a researcher follow while writing a research report ?
5. Explain various steps conducting a Historical Research in education.

2.11 SUGGESTED FURTHER READINGS

S.S.Mathur "Researcher in Philosophy of Education" in Aggarwal, Y.P.(Edu.) Research in Emerging fields of Education New Delhi: Sterling
H.G.Good "Historical research in Education"
Koul Lokesh; Methodology of Educational Research.
Aggarwal Y.P; The science of Educational Research –A source Book.

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PRIMARY AND SECONDARY SOURCES OF DATA
EXTERNAL AND INTERNAL CRITICISM OF THE SOURCES

Unit I **Lesson No. 3**

STRUCTURE

3.1 NTRODUCTION

In the foregoing chapters we have discussed about meaning and areas of educational research, and the various stages that the researcher has to undergo while planning and conducting a research study. The researcher first selects the area of research, and the various stages that the researcher has to undergo while planning and conducting a research study.

One of the important step for the researcher while conducting the research is collection of data. The researcher usually sifts through the vast materials of human activity that testify about past events, and from these he identifies and selects data that are relevant to his problem. These data are classified into primary and secondary sources. It is important for a researcher to distinguish between them and develop skill in locating them.

3.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to:

- Explain various forms of data
- Explain the primary sources of data
- Describe the value of secondary sources of data
- Explain the process of criticism of data
- Describe the external criticism of data
- Explain the internal criticism of data

3.3 PRIMARY SOURCES OF DATA

Primary sources are eye witness accounts and are the only solid based of historical enquiry. Good, Barr and Scates (1941, p.253) have collected them as the 'first witnesses to a fact'. The original documents or remains come under the category of primary sources. They are available in written pictorial and mechanical forms as under.

Personal records like certificates, diaries, autobiographies, affidavits, declarations, letters, wills, deed, contracts and original drafts of speeches articles books and pamphlets.

Official records legislative, judicial, or executive documents prepared by central or state government, municipalities, panchayats or other local bodies, such as constitutions, laws, charters, court proceedings and decisions, the data preserved by missionaries and other religious organizations such as financial records and records of the minutes of the meetings of managing or governing bodies; the information compiled by central or state education departments, special commissions, professional organizations, school boards, administrative authorities, such as the minutes of meetings, reports of committees and commissions, administrative orders, school surveys, annual reports ,budget attendance records, cumulative records of dramas, games, musical and athletic events, and examinations.

Oral testimony of traditions and events. Myths, folk tales, family stories, ceremonies, spoken account of a witness of an event, interviews with administrators, teachers, students, parents or guardians, school patrons and prominent educationists.

Pictorial records, photographs, movies, micro-films, drawings, paintings, coins, and

sculpture.
Remains or relics. Fossils, skeletons, tools, weapons, clothing, buildings, furniture, utensils, art objects, teaching materials, samples of examination question papers, samples of student work, and murals .

6.3.1 CHECK YOUR PROGRESS 1

Write your answers in the space given below :

Q1. What do you mean by Primary Sources of data ? Illustrate your answer with examples.

Q2. Differentiate between Personal Records and Official Records.

3.4 SECONDARY SOURCES OF DATA

Secondary sources are the accounts of an event provided by a person who did not directly observe the event, object, or condition. The person may have directly contacted an actual observer and talked with him or read an account by an observer. Since the testimony of the person is not that of an actual participant or observer secondary sources are subject to an informant danger of inaccuracy and distortion. For this reason, the researcher should rely as much as possible on primary sources and use the secondary sources only to bridge the gaps between the various pieces of primary data.

At times however. It is not always possible to obtain primary data and in such situations the researcher may have to rely on secondary sources. These situations, according to Mouly (1963, p.208), are frequent in education where only fragmentary reports concerning the processes of education are available. He is of the opinion that people in the past considered education so trivial that they did not bother recording anything about its nature or its organizations and consequently, it is relatively difficult to identify suitable primary data to permit the conduct of a good historical research in education. The personal documents as diaries and personal letters also leave wide gaps for the researcher to get the required continuity without resorting to secondary sources.

Secondary sources if used carefully, serve many useful purposes. They may acquaint a researcher to major theoretical issues in his field and to the work that has been done in the area under study. They may suggest possible solutions of the problem and working hypotheses and may introduce the researcher to important primary sources.

A rigid classification of source material is not always possible and practicable. Some type of data may be primary sources for some purposes and secondary source for another. For example, a high school textbook in Indian history will be classified ordinarily a secondary source. But if one making a study of the changing emphasis on national integration in high school history textbooks, the book would be a primary source of data.

In the location of source materials in historical research, the card catalog, periodical indexes, bibliographies, historical reviews, research journals provide helpful guides.

Activity

Check whether the following are primary sources of data (P) or Secondary sources of data (S) :

1) Original drafts of speeches (P) (S)

2) In the location of source materials in historical research, the historical reviews are (P) (S)

3) Pictorial records like photographs etc. (P) (S)

4) Oral testimony of traditions and events like myths and folk tales are (P) (S)

ANSWERS

(1) P (2) S (3) P (4) P

3.5 CRITICSM OF THE DATA

After the data have been identified, the researcher must learn to read them correctly as a basis for developing sound ideas of the past, which in turn may help in interpreting present trends and possibly in predicting future events. For this the researcher subjects his data to rigorous evaluation, which is known as criticism of the data. It involves the dual processes of establishing the authenticity of the source and of establishing the validity of its contents.

The process of establishing authenticity of the data is termed as external criticism and that of establishing the validity of their content is turned as internal criticism.

3.6 EXTERNAL CRITICISM OF DATA

External criticism, also called as lower criticism, checks the genuine ness and authenticity of the source material. It helps to determine whether it is what it appears or claims to be and whether it reads true to be original so as to save the researcher from being the victim of a fraud. The purpose of external criticism according to Mouly (1963,p.210), is, however, not so much 'negative' that is, the detection of fraud-as it is the establishment of historical truth. To determine the genuineness of the historical data, a researcher must possess a rich fund of historical and general knowledge. According to Vandalen (1973,p.168) he also needs 'a good chronological sense, a versatile collect, good common sense, an intelligent understanding of human behaviour, and good plenty of patience and persistence'. The problem of establishing age or authorship of a document may involve such techniques as authentication of signatures, handwriting, script and type; chemical analysis of paint, carbon dating of artifacts, ink, paper, cloth, stone, metals or wood. The researcher, therefore must be familiar with chemistry, archeology, cartography, art, literature, philology, anthropology, paleography, or various modern and ancient languages. If he does not have a knowledge of these fields, he may acquire special training in the fields that are most closely related to his historical problem or may seek the help of impotent experts in the field.

3.7 INTERNAL CRITICISM OF DATA

After the authenticity of his historical data has been established, the researcher proceeds to internal criticism. It is also called as higher criticism and is concerned with the validity, credibility, or worth of the content of the document. Besides the textual criticism, it also involves such factors as competence, good faith, bias and general reputation of the author. Internal criticism is positive in nature when the researcher seeks to discover theliteral and the real meaning of the text. It is negative when the researcher to seek every possible reason for disbelieving the statement made, questioning critically the competence, truthfulness or accuracy, and honesty of the author. Good Barr and Scates (1941,p.262)are of the opinion the both positive and negative criticism are essential in historical research but the researcher should not go so far as to be cynical and hypercritical.

The competence and accuracy of an author is evaluated in relation to his status as a trained eye witness, presence of emotional stress or pressure that might influence the observation and the extent to which the conditions for observing were favourable. It is also evaluated in terms of the time period that has elapsed between the event and its recording by the author so as to ascertain whether the author was able to remember accurately the account of the event.

The author of a documents may know the truth, but for certain reason he may report the evidence only in part or in a distorted form. Distortion of the fact may result from author's motive, bias or prejudice. It may also result from his personal vanity or ambition, literary artifice, known ignorance about the subject, known weakness of telling lies or half-truths, desire to flatter his superiors, desire to please the public, political or religious views or vested

interest

The validity of a historical fact contained in a document can sometimes be evaluated by comparing it with the statements of their author. When there is disagreement among authors, the researcher must establish which one is correct. This he must do on the basis of overall credibility reputation, independent authentication and general consistency with other known facts.

3.7.1 CHECK YOUR PROGRESS 2

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

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. Fill in the blanks :-

(a) Sources of historical evidence may be classified as _____ and _____.

(b) In educational research text books and note books used by the students as long as preserved in original can be classified as _____.

(c) Those persons which were not direct observers in the events of the past are _____.

(d) The researcher subjects his data to rigorous evaluation, which is known as _____criticism of the data.

(e) External criticism checks the _____ and _____ of the source material.

2. What do you mean by criticism of data ?

_____

_____

3. Name various primary sources of data.

_____

_____

3.8 LET US SUM UP

From the above discussion, we conclude that the researcher has to identify and select data through the vast materials of human activity relevant to his problem. The data he has to go through may be in the form of physical remains like roads, buildings etc. or orally transmitted material, or hand-written material etc. of the past events. The sources that he identifies may be primary sources or secondary sources. A primary source is the written or oral testimony of an eyewitnesses or a participant, or a record made by some mechanical device present at the event. Secondary sources are those persons, objects and documents which were not direct observers or participants in the events of the past.

The historical data for evidence collected by the historian must be subjected to a critical and

evaluative analysis which is termed as historical criticism. Historical criticism is of two types- external criticism and internal criticism. External criticism is concerned with the establishment of the authenticity or genuineness of the document or relic. After the authenticity of the document has been established, it is put to internal criticism. Internal criticism deals with the meaning and trustworthiness of the statements contained in the document. Thus the process of establishing authenticity of the data is termed as external criticism and that of establishing the validity of their content is termed as internal criticism.

3.9 KEY WORDS / GLOSSARY

Primary sources : Eye witness records ; original documents or remains .
Relics : An object, tradition etc. from the past that still survives today e.g. fossils .
Oral Testimony: Evidence presented verbally; spoken account of a witness of an event.
Secondary Sources : The material that interpret, analyze or comment on primary sources ; the accounts of an event provided by a person who did not directly observe the event, object or condition

3.10 **Self –Assessment Questions**

1. How is Historical evidence validated in historical research?
2. Explain by giving examples, the primary and secondary sources of data.
3. Describe the process of external and internal criticism of historical data.

3.11 SUGGESTED FURTHER READINGS

H.G.Good “Historical research in Education”
S.S.Mathur “Researches in philosophy of Education” in Aggarwal, Y.P.(Edu.) Research in Emerging fields of Education New Delhi : Sterling
Koul Lokesh; Methodology of Education Research
Aggarwal Y.P; the science of Educational Research ,A source Book.

DESCRIPTIVE RESEARCH
(CONCEPT,STEPS, MERITS AND DEMERITS)

Unit I **Lesson ; 4**

STRUCTURE

4.1 INTRODUCTION

Human knowledge as it exists today broadly consists of facts and theories. New facts, new concepts and new ways of doing things increased its quantum with the passage of time. This knowledge enables us to understand, comprehend, explain, control, predict or cope with a given situation. The sources from which we obtain knowledge range from unreliable to reliable. The reliable knowledge is based on objective verification of generalizations. The acquisition of knowledge requires constant and planned effort by intelligent and highly

trained people. The present level of knowledge is an outcome of the various researches conducted and various methods adopted by man over a period of several centuries.

The choice of the method of research is determined by the nature of the problem. Historical method can tell us much about what existed in the past by determining, evaluating and understanding past events. Descriptive methods can tell us about what exists at present by determining the nature and degree of existing conditions. Because of the methods apparent case and directness, descriptive method has undoubtedly been the most popular and most widely used research method in education.

4.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :

- Explain the nature of descriptive research
- Describe the value of Descriptive Research in Education
- Enumerate the steps of Descriptive Research
- List and describe the various types of Descriptive Research
- Describe the nature of survey studies
- Explain the nature of co-relation studies
- Describe the nature of causal comparative studies

4.3 NATURE OF DESCRIPTIVE RESEARCH

Descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and, whenever possible, to draw valid general conclusions from the facts discovered. Descriptive studies are more than just a collection of data; they involve measurement, classification, analysis, comparison, and interpretation. They collect and provide three types of information; (1) of what exists with respect to variables or conditions in a situation; (2) of what we want by identifying standards or norms with which to compare the present conditions or what experts consider to be desirable, and (3) of how to achieve goals by exploring possible ways and means on the basis of the experience of others or the opinions of experts.

The activities of descriptive studies researchers are not different from those of the other researchers. As in any study they (1) identify and define their problem ; (2) state their objectives and hypotheses; (3) list the assumptions upon which their hypotheses and procedures are based; (4) choose appropriate subjects and source materials ;(5) select or construct tools for collecting data; (6) specify categories of data that are relevant for the purpose of study, and capable of bringing out significant similarities, differences, or

relationships; (7) describe, analyze and interpret their data in clear and precise terms; and (8) draw significant and meaningful conclusions.

Descriptive studies investigate phenomena in their natural setting. Their purpose is both immediate and long range. They constitute a primitive type of research and do not aspire to develop an organized body of scientific laws. Such studies, however, provide information useful to the solution of local problems and at times provide data to form the basis of research of a more fundamental nature.

4.4 VALUE OF DESCRIPTIVE RESEARCH IN EDUCATION

The descriptive research method has undoubtedly been the most popular and the most widely used research method in education. It helps to explain educational phenomena in terms of the conditions or relationships that exist, opinions that are held by the students, teachers, parents and experts, processes that are going on, effects that are evident, or trends that are developing. Because of the apparent case and directness of this method, a researcher can gather information in terms of individual's opinion about some issue, by a simple questionnaire. At times, descriptive survey is the only means through which opinions, attitudes, suggestions for improvement of educational practices and instruction, and other data can be obtained.

The descriptive investigations are of immense value in solving problems about children, school organization, supervision and administration, curriculum, teaching methods and evaluation. There are a number of questions that arise concerning theses aspects of education. For example, the head of a school may wish to know how other school systems are being run, so that he can compare his practices with theirs. This way he will be able to know what procedures and standards are superior to those of other schools. The teachers will also study the conditions existing in their classrooms and that of other teachers.

The descriptive type of research is useful in the development of data gathering instruments and tools like checklists, schedules, questionnaires and rating scales. It also provides the background ideas and data from which many more refined or controlled studies of casual relations are made.

Activity
Make a list of some research studies where descriptive research is used in solving problems in education. Also justify your answer by reasoning out your choice of selection.

4.5 STEPS OF DESCRIPTIVE RESEARCH

The researcher may adopt the following steps:

Selection of the problem

A researcher may be concerned with conditions or relationships that exist, practices that prevail, beliefs, points of view or attitudes that are held, processes that are going on, effects that are being felt or trends that are developing, and may select the problem accordingly from the area or field in which he is interested.

Statement and Definition of the problem

The researcher must state the problem clearly and identify the variables involved in the study.

Identification of Data

After stating and defining the problem, the next step for the researcher is to list the data to be collected for the study. He has to specify whether the data are of qualitative or quantitative in nature and whether the data will be collected in the forms of counts, test scores, responses to questionnaires, interviews and so on.

Selection or Development of Tools

The nature of the data to be collected helps the researcher to select the appropriate tools for the study. If the ready- made tools are not available, the researcher has to develop his own tools. Questionnaires, interviews, psychological tests, rating scales, schedules and attitude scales are the most frequently used tools for descriptive research. If the researcher uses ready-made tools, he should satisfy himself about their reliability, validity, and suitability for sample chosen for the study. If the researcher develops his own tools, he should try them out with a small group in order to evaluate them and make modifications if necessary.

Selection of the sample

The researcher must select the sample about which he wishes to seek information using appropriate sampling techniques. The sample selected should adequately represent the population.

Collection of Data

The researcher should specify the practical schedule for gathering the data from the sample selected for the study with the help of appropriate tools.

Analysis and Interpretation of Data

The data collected is quantified in the form of counts, test scores, responses to questionnaires, etc. These are analysed and interpreted with the help of appropriate parametric or non-parametric statistical tests and qualitative techniques.

Writing of the Research Report

It is the last stage in the descriptive research as in any other form of research. The researcher should exercise extreme caution in generalizing conclusions and reporting them with all the limitations of the study.

4..5.1 CHECK YOUR PROGRESS 1

Write your answers in the space given below :

Q1. Explain the value of Descriptive Research in Education.

Q2. Enlist the steps of Descriptive Research. Explain elaborately any three steps of Descriptive Research in your own words.

4.6 Types of Descriptive Research

Descriptive studies have been classified variously by various writers. These classifications mostly range from the survey, which describes the status quo of educational variables, to the correlational study, which investigates the relationships between variables.

Survey studies

Survey studies are conducted to collect detailed description of existing phenomena with the intent of employing data to justify current conditions and practices or to make more intelligent plans for improving them. Survey studies may take different forms depending upon the scope, nature and purpose of the problem under investigation. Their objective is not only to analyze, interpret, and report the status of an institution, group, or area in order to guide practice in the immediate future, but also to determine the adequacy of status by comparing it with established standards.

Survey studies describe and specify the properties of educational phenomena. They include: school surveys, job analysis, public opinion surveys, and social surveys.

School surveys generally is a comprehensive study of existing conditions. Its main purpose is to determine the overall effectiveness of the school programme and suggest improvement where necessary. The scope of school surveys is large and varied. A single comprehensive school surey may be comprised of various parts or constituent surveys. These include: survey testing, school appraisal, status studies, financial studies, curriculum studies and building surveys.

Job analysis- The method of job analysis is generally used in business and industry. In education , it is employed to gather information about the general duties and responsibilities of the teaching, non-teaching and administrative personnel, the specific duties that they perform, their working conditions, the nature and type of their facilities and their status and relationship in the administrative organization. These data help the researchers to get knowledge about the existing practices and conditions of employment, and the competencies and behavioural traits that the personnel possess or should possess to carry out their work effectively and efficiently.

Public opinion surveys- In order to make some important and crucial decisions, industrial, political, educational and other leaders seek knowledge of the public's opinions, attitudes and preferences. In these surveys the researchers usually make use of questionnaires, schedules or interviews to gather data from the selected group or groups following appropriate sampling procedures.

Social surveys – Social surveys are also called community surveys. These surveys are generally undertaken to study health services, employment conditions, causes of juvenile

delinquency, housing problems, or caste discriminations. The research tools that are used in this research ae questionnaires, schedules, interviews, rating scales and direct observations etc.

Activity
Prepare the report of any one survey that you have conucted. Also identify whether you have used direct observation(face to face interview) or indirect observation (such as opinions on library services of an institute) to conduct it.

Descriptive Studies and its types

A descriptive study is one that is designed to describe the distribution of one or more variables, without regard, to any causal or other hypothesis. Descriptive studies can be of several types namely case reports, case series, cross-sectional studies and ecological studies. In the first three of these, data are collected on individuals, whereas the last one uses aggregated data for groups.

Case study – is an intensive investigation of a social unit which may be an individual, a family, a school, a group of delinquents, drop outs or any teenage gang. Guidance and counsellors and social workers conduct case studies for diagnosing a particular condition or problem and recommending therapeutic measures. The case studies in general are classified as descriptive research types, they have sometimes been conducted for purpose of hypothesis testing and taken the form of experimental research. The following steps are involved in the conduct of the case study.

- The first step is to determine the present status of the individual or the social unit under investigation through direct observation of measurement.
- The next step is to determine the most probable antecedents of the case and to formulate hypothesis or a set of hypotheses through the knowledge of similar cases.
- The third step is verification of the hypothesis. Here the researcher makes use of the knowledge of the present status and the history of the case.
- After verification of the hypothesis, the next step is directed towards further validation of the diagnosis.
- The last step of the case study is the follow up of the case.

Advantages

- The case study attempts to understand an individual or a unit in depth.
- The case study often provides an opportunity for a researcher to develop insight into basic aspects of human behavior.
- The case study helps the researcher to observe events both within and outside the educational setting in their totality.

- A case study may provide insights that will help a researcher to formulate fruitful hypothesis or a set of hypotheses.

Limitations

- The case study data are subjective.
- Although case study method attempts to examine an individual in depth, it inevitably lacks breadth.
- It is impossible to either confirm or refute through empirical study the findings and results of a particular case study.
- A worthwhile case study can rarely be completed by a single individual.

Self Assessment

1) Case study means single and _____ case studies.
2) Case studies based on any evidence of quantitative and _____ research.
3) _____ is the last step of case study.

ANSWERS
(1) multiple (2) qualitative (3) follow-up

Causal-comparative studies - In some investigations, the researcher attempts to explore not only what a phenomenon is like, but how and why it occurs, In such cases, the aim of the researcher is to compare the likeness and differences among phenomena to discover what factors or circumstances seem to accompany or contribute to the occurrence of certain events, conditions and practices. Causal-comparative studies are employed when a researcher cannot manipulate the independent variable and establish the controls that are required in experiments. If a researcher, for example, wants to study emotional stability, he cannot manipulate the home background, socio- economic stability, he cannot manipulate the home background, socio economic status, or intelligence of children and cannot place children in a situation where all factors are kept constant except one variable which is manipulated to determine what causes a particular type of emotional instability. Rather he selects children who, according to a criterion are emotionally instable and compares them with a group of emotional stable children. After analyzing the data he may be able to identify the factors or conditions associated with the group of emotionally disturbed children and, therefore, present a possible explanation of the underlying causes of the emotional instability.
Causal-comparative method of research is useful in the situations when the experimental method is impractical or costly in time, money and effort. In some situations, ethical considerations may prevent a researcher to use experimentation as a method of investigation.
Limitations of causal comparative studies- This study suffer from some limitations:

- Lack of control is the serious limitation of this method of research.
- It is usually difficult to identify the relevant factors causing a particular condition or phenomenon.

- When a relationship between variables is established, it is difficult to determine which the cause is and which the effect is.
- The classification of subjects into dichotomous groups for the purpose of comparison also presents problems.
- In comparative studies of natural situations, the researcher does not have the same control over the selection of subjects as he has in experimental studies. It is difficult to identify existing groups of subjects who are alike in all respects except for their exposure to one variable.

Correlation studies – Correlation studies are a frequently used types of descriptive research concerned with determining the extent of relationship existing between variables. They are used to obtain description of existing phenomenon and enable a researcher to ascertain the extent to which variations in one variable are associated with variations in another. The magnitude of the relationship is determined through the use of the coefficient of correlation. The correlation study is relatively easy to design and conduct. It involves the collection of two or more sets of measurement on a sample of subjects and computation of the coefficient of correlation between these sets of measurements. Several types of relationships can hold between the two sets of measurements. The direction of relationship may be positive or negative; the degree of relationship between the variables may vary from perfect, to high, to average, to no relationship; the relationship may be linear or curvilinear.

Ary et al. (1972. P. 302) have pointed that a researcher must consider the following points when interpreting the coefficient of correlation:

A coefficient of correlation is a simple number and it should not be interpreted ass percentage. A correlation coefficient gives a quantitative determination of the degree of relationship between two variables and it does not necessarily indicate a cause and effect relationship between two variables and it does not necessarily indicate a cause-and-effect relationship between them.

4.6.1 CHECK YOUR PROGRESS 2

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

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. State whether the following are True or False.

(a) Descriptive research studies are designed to obtain precise information concerning the current status phenomena (T/F)

(b) Descriptive investigations are not of immense value in solving problems about children. (T/F)

(c) Descriptive type of research is useful in the development of data gathering tools like checklists, questionnaires etc. (T/F)

(d) The comprehensive school survey does not cover the pupil transportation (T/F)
(e) In causal- comparative studies the researcher attempts to explore about the how and why a phenomena occurs. (T/F)

2. Describe the nature of survey studies.

_____
_____

3. List the various types of Descriptive Research in education .

_____
_____
-
_____
_____

4.7 LET US SUM UP

_____
_____

From the above discussion we conclude that Descriptive research studies tell us about what exists at present by determining the nature and degree of existing conditions. These are designed to obtain pertinent and precise information concerning the current status of phenomena and whenever possible to draw valid general conclusions from the facts discovered. Descriptive Research is not directed towards hypothesis testing. These studies investigate phenomena in their natural settings. Descriptive Research differs from other types of research in purpose and scope. Descriptive research studies involve events that have already taken place and are related to a present condition. Descriptive research have been classified variously by various writers which mostly range from the survey, which describe the status-quo of educational variables, to the correlational study, which investigate the relationships between variables. Selection of the problem, statement and definition of the problem, identification of data, selection and development of tools, selection of the sample, collection of data, analysis and interpretation of data and writing of the Research Report are the various steps followed in Descriptive Research.

_____
_____

8.8 KEY WORDS / GLOSSARY

_____
_____

Hypotheses : An idea that is suggested as the possible explanation for something but has not yet been found to be true ; a tentative assumption made in order to draw out and test its logical or empirical consequences

Descriptive investigations : A type of scientific study that focusses on observing, describing or sometimes measuring natural systems.

Sample : a group of people , items or objects taken from a larger population ; a representative part or a single unit from a large whole or group presented for inspection or shown as evidence of quality

Survey : a study of the opinions, behaviour etc.of a group of people.
Analysis : the careful examination of the different parts or details of something.
Interpretation : an explanation or understanding of something.

4.9 Self –Assessment Questions

1. Describe the nature of Descriptive Research.
2. Describe the value of Descriptive Research.
3. List and describe the various types of Descriptive Research.
4. Elucidate the nature of Causal-comparative studies.
5. Explain the nature and purpose of cross-sectional studies.

4.10 SUGGESTED FURTHER READINGS

Cooper, Dan. H. (1946). " Contributions of School Surveys of Educational Administrations" in Encyclopaedia of Educational Research. C.W.Harris, ed. New York : The Macmillan Company . 1960, p. 1212.
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H.G.Good "Historical research in Education"
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Aggarwal Y.P; the science of Educational Research ,A source Book.

EXPERIMENTAL RESEARCH

Unit – I **Lesson : 5**

STRUCTURE

5.1 INTRODUCTION

Research is one way of collecting and understanding information and finding answers to questions. Research is a way of thinking. The main purpose of research is developing and testing new theories for the enhancement of knowledge. In research we work within a framework of a set of theories, use methods and try to be unbiased and objective. Research is a scientific methodology in a controlled observation and experiments are the basic tool, which gives the status of science to a subject. It is a systematic attempt to study. Experimental research is mainly used in science subjects such as physics, chemistry, medicine, biology etc. Experiment requires two variables, one independent variable and the other dependent variable. It is important that in experimental research the independent

variable is manipulated and the effect of manipulation is observed on the dependent variable. When we intend to do research, the first thing we have to do is to decide what research question we want to find answers to. There are various steps through which we just pass in our research journey in order to find the answers to our research questions. Conceptualizing a research design is one of the important steps in planning a research study. The main function of a research design is to explain how we will find answers to the research question.

5.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :-

- Define experimental research
- List and describe the steps which the researcher may adopt in conducting the experimental type of research
- Define Research design
- Describe the functions of research design
- Identify the terms of research design
- List and explain different research designs
- Define Quasi- experimental design
- List and explain the validity of the design
- Define internal and external validity of the design

5.3 NATURE OF EXPERIMENTAL DESIGN

By experiment we refer to that portion of research in which variables are manipulated and their effects upon other variables are studied. The researcher deliberately manipulates some aspect of the experiment in which he is interested. He causes certain things to happen, and he observes how the condition is affected or changed. Although experimentation is the classic laboratory method of physics, chemistry, biology and other sciences, it has been effectively used in non-laboratory educational settings such as the class-room.

Experimental method provides for much control and , therefore, establishes a systematic and logical association between manipulated factors and observed effects. The researcher defines a problem and proposes a tentative answer or hypothesis. He tests the hypothesis and accepts or rejects it in the light of the controlled variable relationship that he has observed.

The early attempts at experimental designs which may be called as classical approach incorporated the manipulation of a single experimental variable as a time, control of all other variable. Fisher introduced experimental concepts and design of far-reaching applications and is said to be the father of modern experimental methods. The contributions of R.A.Fisher in terms of his concept of achieving pre-experimental equation of conditions through random

selection of subjects and random assignment of treatments have provided an effective and sound method of conducting-realistic experiments with human beings. His techniques of analysis of variance and co-variance made it possible to study complex interactions through factorial designs.

There are four essential characteristics of experimental research: (i) Control; (ii) Manipulation;
(iii) Observation; and (iv) Replication.

Control- Control is the essential ingredient of experimental method. It refers to the extent to which different factors in an experiment are accounted for. Since more of the factors are accounted for with accuracy and more control is being enforced, the researcher has more confidence that his results are dependable.

Manipulation – Manipulation of a variable is another distinguishing characteristic of experimental research. It refers to a deliberate operation of the conditions by the researcher.

Observation- In experimental research, the researcher studies the effect of the manipulation of the independent variable on a dependent variable.

Replication- Replication is a matter of conducting a number of sub-experiments within the framework of an overall experimental design. The researcher, instead of comparing a single control case with a single experimental case, makes a multiple comparison of a number of cases of the control group and a number of cases of the experimental group, all within the same experimental framework.

Self-assessment Questions

Fill in the blanks

1) Research problem can be stated in the form of _____.

2) The main task of an experimenter is to maximize the _____.

3) Research is a _____ methodology in a controlled setting.

4) _____ design is generally conducted in the laboratory with complete control over all variables and all subjects.

ANSWERS
(1) hypothesis (2) variance (3) scientific (4) Experimental

5.4 STEPS OF EXPERIMENTAL RESEARCH

The steps of the experimental method are not different from those of a scientific method. For the sake of clarification, the major steps may be described as under:

Surveying the literature relating to the problem

For a worthwhile research based on experimentation, the researcher needs to acquire up-to-date information relating to his problem.

Selecting and defining the problem

Experimental research starts with the selection of the problem which is amenable to experimentation. It needs a rigorous logical analysis and definition of the problem in precise terms. The variables to be studied should be defined in operational terms clearly .

Stating of Hypotheses

The stating of problem suggest that an antecedent condition or phenomenon (independent variable) is related to the occurrence of another condition, phenomenon, event, or effect (dependent variable). To test a hypothesis, the researcher attempts to control all the conditions except the independent variable which he manipulates.

Constructing the Experimental Plan

Experimental plan refers to the conceptual framework within which the experiment is conducted.

5.4.1 CHECK YOUR PROGRESS 1

Write your answers in the space given below :

Q1. Explain the nature of Experimental Design in your own words.

Q2. Enumerate the steps of Experimental Research .

5.5 EXPERIMENTAL RESEARCH DESIGN

An experimental design is to the researcher what a blueprint is to an architect. It provides the researcher an opportunity for the comparisons required by the hypotheses of the experiment and enables him to make a meaningful interpretation of the results of the study with the help of statistical analysis of the data.

Based on the presence, absence and the amount of controls possible the experimental DESIGNS can be classified as follows.

Pre-Experimental Designs

Pre-experimental Designs provide little or no control of extraneous or situation variables. They are however, still being used in the study of educational problems.

One Group Pre-test Post –test Design

When an experimenter uses this design, he measures dependent variable, before the independent variable X is applied or withdrawn and then takes its measurement again afterwards. The difference in the measurements of dependent variable, if any, is computed and is taken as the amount of change as a result of the application or withdrawing of independent or treatment variable.

PARADIGM FOR THE DESIGN 1: One Group Pre-test Post Design

Pre Test	Independent variable	Post test
T1	X	T2
Mean of the criterion test	Teaching through programmed instruction	Mean of the criterion test

Limitations

Since the design involves only one group and one teacher, it seems to control inter subject differences and extraneous variables. The control, however, is superficial and does not check the threats to internal validity.

True- Experimental Designs

Campbell and Stanley recommends the following experimental design which is powerful enough to control most of the sources of confounding to great extent.

Pre-test Post-test Control Group Designs

Group	Pre-test	Treatment	Post-test
A (Random)	O1	X	O2
B (Random)	O3		O4

In which R stands for random formation of groups and their random assignment to experimental and control conditions. O1 to O4 denote observations. The randomization process used in the formation of the group and the presence of a comparison group control all the possible threats to the internal validity of the experiment. Hence it is the most widely

used design in behavioural sciences research.

The Post-test only Control Group Design

Group	Pre-test	Treatment	Post-test
A (Random)		X	O1
B (Random)			O2

To eliminate the possibility of pre-test and treatment interaction effects, this design drops the pre-testing stage altogether. On the force of the argument that randomization is the best method of ensuring pre-experimental equivalence of the groups, the psychological reasons of "knowing for sure" are discarded with profit. There may be situations in which pre-testing may be impossible or hazardous.

Quasi-Experimental Designs

There are many natural setting in which the researcher can introduce some aspects of experimental designs into his scheduling of the data collection procedures even though he lacks a full control over the scheduling of experimental stimuli. He has no control over the administration of the treatment (The when and to whom of response and the ability to randomize responses). These reasons/research situations can be regarded as quasi-experimental situations because it is unfeasible the design true
experiments but a causal inference is desired. Sometimes the need for stronger external validity is another reason for the use of quasi-experimental research.

The word 'quasi' means 'almost' or 'as if'. Hence, the term 'quasi-experimental design' indicates that these design look "as if they are experimental", or sometime reach "almost a true experimental setting. These can be regarded as closer to true experimental designs when compared with the pre-experimental ones.

Some of the popular quasi-experimental designs are described as follows:

Non-equivalent Pre-test-Post-test Control Group Design

Group	Pre-test	Treatment	Post-test
A (Non-Random)	O1	X	O2

B (Non-Random)	O3	O4

This design is like the true experimental design using a pre-test post-test central group situation but differs in the formation of groups which is non-random and hence non-equivalent in the present case. This design can be further extended by using more than two groups. Suppose three different method of teaching a foreign language are to be compared for efficacy, the experimenter can get hold of three intact classrooms and teach each class by using one of the three methods.

Group	Pre-test	Treatment	Post-test
A (Non-Random)	O1	X1	O2
B (Non-Random)	O3	X2	O4
C (Non-Random)	O5	X3	O6

There is no control group. However, each group is used as a control for the other group.

The Separate-sample Pre-test Post-test Design

Group	Pre-test	treatment	post-test
A (Random)	O1	(X)	
B (Random)		X	O2

In this design though the group are formed randomly. Group A is measured before the treatment and group B is measured only after the treatment. (X) indicates presentation of X irrelevant to the research question. Though a weak design it has been used extensively in social science experiments. It is also called "simulated before-and-after design". The design lacks control of 'history'.

An extension of the above design is given as follows:

The Separate Sample Pre-test----- Post-test control Group Design

Group	Pre-test	Treatment	Post-test

A (Random)	O1	(x)	
B (Random)		X	O2
C (Random)	O3		
D (Random)			O4

This design also uses groups as a whole or intact groups. There is random assignment of groups A and B above the dotted lines; similarly below the dotted line. The dotted line shows the non-equivalence of groups above it and those below it.

Time Series Designs

If a group is repeatedly measured before and after the treatment, rather than once before and once after, a different design called Time series Design is created. These designs are especially useful when there are continuous naturally occurring observations of the dependent variable over time and there is a sudden or distinct treatment during the observations. These designs have the advantage of having a series of pre and post-observations to find out the pattern of stability and change more accurately as compared to the pre-test post-test designs. Look at the following time series designs to form an idea of their methodology.

Single-Group Interrupted Time Series Design

Group	Pre-observations	Treatment	Post-Observations
A	O1,O2,O3,O4,O5,O6	X	O7,O8,O9,O10,O11,O12

Control-Group Interrupted Time Series Design

Group	Pre-observations	Treatment	Post-observations
A	O1,O2,O3,O4,O5,O6	X	O7,O8,O9,O10,O11,O12
B	O1,O2,O3,O4,O5,O6	X	

O7,O8,O9,O10,O11,O12

In design No.1 there is only one group repeatedly measured six times before and six times after the treatment introduced the time gap between measurement is the same. In design No 2 while the procedure is similar to design No.1, a control group has been added to control for the "history effects", and hence a definite improvement over the first one.

These are basis time series designs. There are however, variations of the same. We can have more than two groups and multiple treatments to compare. The experimenter instead of introducing the treatment may withdraw some already occurring phenomenon.

The choice of design will depend on the variables to be studied, the circumstances and setting available, and the claims of the plausible rival hypotheses, and the extent of control the experimenter desires, and can actually muster.

Self assessment

1) The subjects in experimental research are _____.

2) The experimental subjects are in _____ conitions.

3) The experiment is always _____ in terms of results.

4) The experiment is _____.

5) One experimental group is taken and subjected to the manipulation of the _____ variable
(intervention) and see the effects of it on the subects of the _____ group.

ANSWERS
(1) homogeneous (2) controlled (3) quantitative (4) replicable. (5) independent, experimental

5 .6 INTERNAL AND EXTERNAL VALIDITY OF RESULTS IN EXPERIMENTAL RESEARCH

Validity

Validity refers to the degree to which a test measures, what it claims to measure. It is very necessary for a test to be valid for its proper administration and interpretation.

Internal Validity

Internal validity is the most fundamental type of validity because it concerns the logic of the relationships between the independent variable and dependent variable. This type of validity is an estimate of the degree to which inferences about causal relationship can be drawn, based on the measures employed and research design. Properly suited experimental techniques, where the effect of an independent variable upon the dependent one is observed under highly controlled conditions makes possible higher degree of internal validity.

Threats to Internal Validity

These include (i) confounding, (ii) selection bias, (iii) history, (iv) maturation, (v) repeated testing, (vi) instrument change, (vii) regression towards the mean, (viii) mortality , (ix) diffusion, (x) compensatory rivalry, (xi) experimenter bias.

(i) Confounding – confounding error that occurs when the effect of two variables in an experiment cannot be separated, resulting in a confused interpretation of the results.

(ii) Selection bias – Any bias in selecting a group can undermine internal validity. Selection bias indicates the problem that occurs as a result of its existence at the pre-test differences between groups, may interact with the independent variable and thus influence the observed outcome and creates problems.

(iii) History- Events outside the experiment or between repeated measures of dependent variables may influence participants responses, attitudes and behavior during process of experiment, like; natural disasters, political changes etc.

(iv) Maturation- Usually, it happens that subjects change during the course of an experiment or between measurements. Permanent changes (such as physical growth) and temporary changes (like fatigue and illness) may alter the way a subject would react to the independent variable.

(v) Repeated testing- Participants may be driven to bias owing to repeated testing. Participants may remember correct answers or may be conditioned as a result of incessant administration of the test.

(vi) Instrument change – If any instrument is replaced/changed during process of experiment, then it may effect internal validity as alternative explanation easily available.

(vii) Regression towards the mean- During the experiment, if subjects are selected on the basis of extreme scores, then there are chances of occurrence of such an error.

(viii) Mortality- It should be kept in mind that there may be some participants who may have dropped out of the study before its completion. If dropping out of participants leads to relevant bias between groups, alternative explanation is possible that account for the observed differences.

(ix) Diffusion – It might be observed that there will be a lack of differences between experimental and control groups if treatment effects spread from treatment groups to control groups. This, however, does not mean that, independent variable will have no effect or that there would not be a no relationship between dependent and independent variable.

(x) Compensatory rivalry - There will be a change in the behavior of the subject if the control groups alter as a result of the study.

(xi) Experimenter bias : Experimenter bias happens while experimenters, without any intention or reluctance, behave differently to the participants of control and experimental

groups, that in turn affects the results of the experiment. Experimental bias can be reduced by keeping the experimenter from knowing the condition in the experiment or its purpose and by standardizing the procedure as much as possible.

External Validity

According to Mc Burney and White (2007), external validity concerns whether results of the research can be generalized to another situation, different subjects, settings, times and so on. External validity lacks from the fact that experiments using human participants often employ small samples collected from a particular geographic location or with idiosyncratic features. Because of this, it cannot be made sure that the conclusions drawn about cause-effect-relationships are actually applicable to the people in other geographic locations or in the absence of these features.

Threats to External Validity

How one may go wrong in making generalisations, is one of the major threats to external validity. Usually, generalisations are limited when the cause (i.e independent variable) is dependent upon other factors; as a result, all the threats to external validity interact with the independent variable.

a) Aptitude-Treatment-Interaction: The sample might have some features that may interact with the independent variable causing to limit generalizability.

b) Situations : All the situational factors may limit generalisations.

c) Pre- test effects : When the cause-effect relationships can only be found out after the pre-tests are carried out, then, this also tends to limit the generality of the findings.

d) Post-test effects- When cause-effect relationships can only be explored after the post tests are carried out, then this can also be a cause for limiting the generalisations of the findings.

e) Rosenthal Effects – When derivations drawn from the cause- consequence relationships cannot be generalized to other investigators or researchers.

Self Assessment Questions

1) Results cannot be generalized to another situation or population in external validity. (T/F)

2) Dropping out of some subjects before an experiment is completed causing a threat to internal validity. (T/F)

3)Any bias in selecting the groups can enhance the internal validity. (T/F)

4) Internal validity concern the logic of relationship between the independent variable and dependent variable. (T/F)

ANSWERS

(1) False (2) True (3) False (4) True

5.7 VARIABLES IN EXPERIMENTAL RESEARCH

A variable, as the name implies, is something that varies. This is the simplest way of defining a variable.

Webster says that a variable is "a thing that is changeable" or " a quantity that may have a number of different values. " A variable is something that has at least two values; however, it is also important that the values of the variable be observable. Thus, if what is being studied is a variable, it has more than one value and each value can be observed.

Types of variables in experimental research

Independent variable – An independent variable or stimulus variable (as Underwood calls it) is that factor manipulated or selected by the experimenter in his attempt to ascertain its relationship to an observed phenomenon.

Dependent upon the mode of manipulation, some expets have tried to divide the independent variable into 'Type E' Independent Variable and 'Type S' independent variable (D'Amato, 1970). Type E independent variable is one of which is directly or experimentally manipulated by the experimental and type S independent variable is one which is manipulated through the process of selection only. For example the experimenter wants to study the effect of noise upon the task performance in an industry. Here the IV (Independent Variable) is the noise and the DV (Dependent Variable) is the task performance. He may manipulate the noise by dividing into three categories- continuous noise, intermittent noise and no noise and examine its effects in task performance. Here the noise is being directly manipulated by the experimenter and hence, it constitutes the example of Type- E independent variable. Suppose , for the time being, that the experimenter is interested in answering the question: Is the rate of production dependent upon the age of workers? Age is here the independent variable. For investigating this problem, the experimenter wil have to select groups of workers on the basis of their age in a way by which he can get an appropriate representation from different age groups ranging from say, 16 to 55 years. Subsequently, he will compare the rate of production obtained by each age group and finally, conclude whether or not age is a factor in enhancement of the performance. Hence this constitutes the examples of S-independent variables.

Dependent Variable- A dependent variable is the factor that appears, disappears, or varies as the experimenter introduces, removes or varies the independent variable. (Townsend, 1953). The dependent variable is a measure of the behavior of the subject. The dependent variable is a measure of the behavior of the subject. The dependent variable is the response that the person or animal makes. Here the relationship between independent and dependent variables is studied. The relationship is that of dependence. One variable depends upon the other. Suppose the researcher finds a relationship between meaningfulness of the learning material and speed of learning. Speed of learning then depends upon meaningfulness; the greater the meaningfulness, the faster the learning. The speed of learning is, therefore, called dependent variable; meaningfulness is independent variable. Similarly, rest between work periods is independent variables; output of work is dependent variable. In an experiment one discovers and confirms a relationship between an independent variable and a dependent variable.

Confounding variables – is one that varies with the independent variable. While doing a study if we are not careful then two variables may get combined so that the effect of one cannot be separated from the effect of the other. This is known as confounding. For instance, if a study of the effect of the television viewing on perception of violence is studied and the experimental group contained only adolescents, whereas the control group only adults;, the age of participants would be confounded with the independent variable under study. Confounding makes the conclusions of the study doubtful. It is, therefore, necessary that effort should be made to un-confound the variables.

Univariate variables -'Uni' means 'one', so the data has only one variable (univariate). Univariate data requires to analyze each variable separately. Data is gathered for the purpose of answering a question, or more specifically, a research question. E.g the salaries of workers in a specific industry; the variable in this example is workers salaries.

Univariate data is a term used in statistics to describe data that consists of observations on only one characteristic or attribute. There is only one variable in univariate data. The analysis of univariate data is thus the most basic type of analysis because it deals with only one varable that changes. It is uninterested in causes or relationships, and its primary objective is to explain the data and detect patterns within it.

The main characteristics of univariate data are as follows:

- Univariate data gathers data around a single, random variable. It describes each variable separately.
- Univariate data describes the variable's response pattern.

Bivariate variables – Bivariate is where two variables are observed. One variable here is dependent while the other is independent. For example , the researcher has bivariate data when he/she is studying two variables. These variables are changing and are compared to find the relationships between them. Similarly, if the researcher is studying a group of students to find out their average Math score and their age, there are two variables (Math score and age). So, Bivariate variable is used to compare two sets of data and to discover any relationships between them.

Multivariate variables – Multivariate variables refers to multiple dependent variables that result in one outcome. This means that a majority of our real world problems are multivariate. For example, based on the season, we cannot predict the weather of any given year. Several factors play an important role in predicting the same.

Multivariate analysis encompasses all statistical techniques that are used to analyze more than two variables at once. The aim is to find patterns and correlations between several variables-simultaneously allowing for a much deeper, more complex understanding of a given scenario than with bivariate analysis.

5.7.1 CHECK YOUR PROGRESS 2

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

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. State whether the statement is True or False.

(a) The selection of a problem is the last step of research. ( )

(b) After defining the research problem the hypothesis must be formulated. ( )

(c) Experimental research is used in science subjects ( )

(d) Research problem can be stated in the form of hypothesis. ( )

(e) Experimental design is not generally conducted in the laboratory with complete control over all variables and all subjects . ( )

2. Define experimental research.

_____

_____

3. Define Research design.

_____

_____

_____

5.8 LET US SUM UP

From the above discussion, we conclude that Research is a scientific methodology in a controlled observation and experiments are the basic tools which gives the status of science to a subject/discipline. It is a systematic attempt to study a phenomenon.

Experimental research is based on highly rigorous procedures and aims at producing highly reliable and valid conclusions. It is a systematic and scientific approach to research in which the researcher deliberately manipulates some aspect of the experiment in which he is interested. He causes certain things to happen, and he observes how the condition is affected and changed. The major steps of experimental research are- surveying the literature relating to the problem, selecting and defining the problem, stating the hypothesis and constructing the experimental plan.

When an experimenter intends to do research, the first thing to do is to decide what research question is to be studied. Having decided about the research question or problem the next thing is to decide how to go about finding their answer. There are various steps through which the researcher pass in the research journey in order to find the answers to research questions. Conceptualising a research design is one of the important steps in planning a research study. The main function of a research design is to explain how to find answers to the research question. For any investigation the selection of an appropriate research design is crucial in enabling the researcher to arrive at valid findings and conclusions. In this lesson we have discussed about various experimental designs.

In experimental research the researcher manipulates one or more variables and controls and measures the other variables. A variable is something that varies. Variables are important in bringing clarity and specificity to the conceptualizing of a research problem, to formulation of hypothesis and to the development of the research instrument. Knowledge of different

types of variables play a crucial role in research. There are different kinds of variables such as independent variables, dependent variables, confounding variables etc. In this lesson we have also discussed about concept of univariate, bivariate and multivariate variables. The data which has only one variable is univariate variable. Univariate data requires to analyze each variable separately. Bivariate analysis is one of the statistical analysis where two variables are observed. One variable here is dependent while the other is independent. Multivariate refers to multiple dependent variables that result in one outcome. This means that a majority of our real world problems are multi-variable.

5.9 KEY WORDS / GLOSSARY

Research Design : the over all plan of frame work that guides the collection and analysis of data to address a research question.

Validity : the extent to which a study accurately measures what it intends to measure, ensuring that conclusions drawn are sound and applicable to the broader population.

Variables : characteristics that can change or take on different values.

Univariate : a statistical method that examines a single variable at a time focusing on describing its characteristics without considerate relationships with other variables.

Bivariate : the data sets that contain two variables, where each piece of information in the data set has two values associated with it.

5.10 Self –Assessment Questions

1. Define the nature of Experimental research.
2. List and describe the steps which the researcher may adopt in conducting the experimental type of research.
3. Define an experimental design.
4. Define validity of the design.
5. Explain internal validity and external validity of the design.
6. List the various types of Time series designs.
7. Write short notes on :

(a) Independent variable (b) Dependent variable.

5.11 SUGGESTED FURTHER READINGS

Best, John W. (1977), Research in Education, New Delhi; Prentice Hall of India Private Limited.
H.G.Good "Historical research in Education"
S.S.Mathur "Researches in philosophy of Education" in Aggarwal, Y.P.(Edu.) Research in Emerging fields of Education New Delhi : Sterling
Koul Lokesh; Methodology of Education Research
Aggarwal Y.P; the science of Educational Research ,A source Book.

QUANTITATIVE RESEARCH : CONCEPT AND CHARACTERISTICS

Unit –I **Lesson :1**

STRUCTURE

1.1 INTRODUCTION

Students have you observed that human mind is very curious and there is a scientific quest for understanding how it works. We as human beings want to know why we think, feel and behave as we do. What makes individual differences in human beings. Psychologists and educationists as scientists, answer these questions systematically. They develop principles to explain them and use those principles to solve various problems.

Research is a process through which new knowledge is discovered. It is a systematic and objective attempt to provide answers to certain questions. The word research is composed of two syllables, re and search which means to examine carefully and probe deeply to learn. According to (Grinnell 1993) The simplest meaning of research is to search for facts, answers to research question and solution for the problem.

Conducting research requires to follow a sequence of steps. These steps vary with the nature of the problem. The exact sequence and steps vary somewhat with the type of research.

1.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :

- Explain the concept of Quantitative Research
- Describe the purpose of quantitative Research
- Identify the characteristics of quantitative Research
- Describe the advantages Quantitative Research
- Identify the limitations of Quantitative research

1.3 CONCEPT

Quantitative research is a research strategy that focuses on quantifying the collection and analysis of data. It is formed from a deductive approach where emphasis is placed on the testing of theory. Quantitative research collects information from existing and potential customers using sampling methods and sending out online surveys, on line polls, and questionnaires, e.g. one of the main characteristics of this type of research is that the results can be depicted in numerical form.

Quantitative Research is the process of collecting and analyzing numerical data. It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations.

Quantitative Research is widely used in the natural and social sciences: biology, chemistry, psychology, economics, sociology, marketing etc.

Examples

How has the average temperature changed globally over the last century?

Does working from home increase productivity for people with long commutes?

There are four main types of Quantitative Research, Descriptive, Correlational, Causal-comparative/Quasi-experimental, and Experimental Research, attempts to establish cause-effect relationships among the variables.

1.4 PURPOSE

The purpose of quantitative research is to attain greater knowledge and understanding of the social world. Researchers use quantitative methods to observe situations or events that affect people. Quantitative research produces objective data that can be clearly communicated through statistics and numbers. This is done in a systematic scientific way, so the studies can be replicated by someone else. The data is primarily used to :

- Find patterns and averages
- Make predictions
- Test causal relationships
- Generalize results to wider populations

1.4.1 CHECK YOUR PROGRESS 1

Write your answer in the space given below :

Q1. Explain the concept of Quantitative Research .

Q2. Discuss the purpose of Quantitative Research in your own words.

1.5 CHARACTERISTS

Objective –Quantitative Research seeks accurate measurement and analysis of target concepts. It is not based on mere intuition and guesses. Data are gathered before proposing a conclusion or solution to a problem.

Clearly defined Research Questions – The researchers know in advance what they are looking for. The research questions are well defined for which objective answers are sought. All aspects of the study are carefully designed before data are gathered.

Structured Research instruments – Standardized instruments guide data collection, thus, ensuring the accuracy, reliability and validity of data. Data are normally gathered using structured research tools such as questionnaires to collect measurable characteristics of the population like age,socio-economic status, numbers of children, among others.

Numerical data – Figures , tables or graphs showcase summarized data collection in order to show trends, relationships or differences among variables. In sum, the charts and tables allow you to see the evidence collected.

Large sample sizes- To arrive at a more reliable data analysis, a normal population distribution curve is preferred. This requires a large sample size, depending on how the characteristics of the population vary. Random sampling is recommended in determining the sample size to avoid researcher's bias in interpreting the results.

Replication – Qualitative methods can be repeated to verify findings in another setting, thus strengthening and reinforcing validity of findings eliminating possibility of spurious conclusions.

Future outcomes- By using complex mathematical calculations and with the aid of computers, if then scenarios may be formulated thus predicting future results. Quantitative Research puts emphasis on proof, rather than the discovery.

Self Assessment Questions

1) An investigator comes up with a new ideas or a different way of thinking is known as context of discovery. (True/ False)
2) Descriptive research is a type of quantitative research. (True / False).
3) Quantitative research puts emphasis on the discovery. (True/False)
4)The correlation study is reltively easy to design and conduct. (True / False)
Answers

(1) True (2) True (3) False (4) True.

1.6 METHODS

Quantitative Research methods can be used for descriptive, correlational or experimental research.

Descriptive Research

Descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and, whenever possible, to draw valid general conclusions from the facts discovered. They are restricted not only to fact finding but may often result in the formulation of important principles of knowledge and solution of significant problems concerning local, state, national and international issues. Descriptive studies are more than just a collection of data, they involve measurement, classification, analysis, comparison and interpretation. They collect and provide three types of information: (1) of what exists with respect to variables or conditions in a situation (2) of what we want by identifying standards or norms with which to compare the present conditions or what experts consider to be desirable and (3) of how to achieve goals by exploring possible ways and means on the basis of the experience of others or the opinions of experts.

Correlational Research

Correlational studies are a frequently used types of descriptive research concerned with determining the extent of relationship existing between variables. They are used to obtain description of existing phenomenon and enable a researcher to ascertain the extent to which variations in one variable are associated with variations in another. The magnitude of the relationship is determined through the use of the coefficient of correlation. For instance, on the basis of earlier studies a researcher may hypothesize that there is a relationship between performance of an intelligence test and a test of achievement in arithmetic. The correlation technique will help him to test his hypothesis about the relationship between these two variables as well as to assess the magnitude of the relationship. The correlation study is relatively easy to design and conduct. It involves the collection of two or more sets of

measurement on a sample of subjects and computation of the coefficient of correlation between these sets of measurements.

Experimental Research

Experimental Method establishes a systematic and logical association between manipulated factors and observed effects. The researcher defines a problem and proposes a tentative answer or hypothesis. The researcher tests the hypothesis and accepts or rejects it in the light of the controlled variable relationship that he has observed.

Experimental Research is mainly used in science subjects such as physics, chemistry, medicine, biology etc. Experiment requires two variables, one independent variable, and the other dependent variable. It is important that in experimental research the independent variable is manipulated and the effect of manipulation is observed on the dependent variable.All other extraneous factors are completely controlled within the laboratory. It is based on research design which uses manipulation and controlled testing to understand the causal processes. Generally, we can manipulate one or more variables to determine their effect on a dependent variable. In other words, it is a systematic and scientific approach to research in which the researcher manipulates one or more variables, and controls and measures the other variables.

John Stuart Mill (1846) stated five canons or rules of experimental research

- The method of agreement
- The method of difference
- The joint method
- The method of residues and
- The method of concomitant variations.

Self Assessment Questions

Fill in the blanks

1) Descriptive research is one of the important methods of _____ research.

2) Correlation studies are concerned with determining the extent of relationship existing between_____.

3) Experimental research studies the relationship between two variables _____ and _____.

Answers

1) Quantitative 2) Variables 3) independent, dependent.

1.7 ADVANTAGES

The advantages of Quantitative Research include the following:

- It is objective. The most reliable and valid way of concluding results, giving way to a new hypothesis or to disproving it. Because of bigger no. of sample of population, the results or generalizations are more reliable and valid. Since it provides numerical data, it can't be easily misinterpreted.
- The use of statistical techniques facilitates sophisticated analyses and allows you to comprehend a huge number of vital characteristics of data.
- It is real and unbiased. If the research is properly designed it fitters out external factors, and so can be seen as real and unbiased.
- The numerical data can be analyzed in a quick and easy way. By employing statistically valid random models findings can be generalized to the population about which information is necessary.
- Quantitative studies are replicable. Standardized approaches allow the study to be replicated in different areas or over time with formulation of comparable findings.
- Quantitative experiments are useful for testing the results gained by a series of qualitative experiments, leading to a final answer, and narrowing down of possible directions to follow.

1.8DISADVANTAGES

Quantitative Research requires a large no. of respondents. It is assumed that the larger the sample is the more statistically accurate the findings are.

It is costly. Since, there are more respondents compared to qualitative research, the expense will be greater in reaching out to these people and in reproducing questionnaires.

The information is contextual. Factors to help interpret the results or to explain variations are usually ignored. It does not consider the distinct capacity of the respondents to share and elaborate further information unlike quantitative research.

Much information is difficult to gather using structured research instruments, specifically on sensitive issues like pre-marital sex, domestic violence among others.

If not done seriously and correctly, data from questionnaire may be incomplete and inaccurate. Researchers must be on the look out on respondents who are just guessing in answering the instrument.

1.8.1 CHECK YOUR PROGRESS 2

Note : (a) Write your answers in the space given below:
(b) Compare your answers with those given at the end of the lesson/ above sub-section.

1. Which of the following statements are true :-

a) The first step of research process is identifying a problem. T/F
b) Selection of particular data collection method depends on the nature of study. T/F
c) Purpose of Quantitative research is to attain scientific knowledge. T/F
d) Research is a process through which old knowledge is discovered. T/F
e) To conduct Quantitative research is costly. T/F

2. What do you mean by structured Research instruments?

3. Give any two disadvantages of Quantitative research.

1.9 LET US SUM UP

From the above discussion, we conclude that Research is a careful, systematic, patient study and investigation in some field of knowledge, undertaken to establish facts or principles. The purpose of research is to discover answers to questions through the application of scientific procedures. The main aim of the research is find out the truth which is hidden and which has not been discovered as yet. Conducting research requires to follow a sequence of steps. The steps vary depending upon the quantitative or qualitative approach.

Quantitative research deals in numbers, logic and an objective stance. Quantitative research focuses on numeric and unchanging data and detailed, convergent reasoning rather than divergent reasoning (i.e the generation of a variety of ideas about a research problem in a spontameous, free-flowing manner). In addition Quantitative research is important because it enables us to conduct research on a large scale; it can reveal insights about broader groups of people or population as a whole; it enables researchers to compare different groups to understand similarities and differences; and it helps business. Quantitative research produces objective data that can be clearly communicated through statistics and numbers. This is primarily done in a systematic scientific way so the studies can be replicated by someone else.

1.10 KEY WORDS / GLOSSARY

Structured : Data organized in a standardized, easily searchable format, often resembling tables with rows and columns ; standardized ; the use of uniform consistent procedures in all phases of data collection.
Replication : Copy; reproduction of the similar phenomena or concept; the action or process of reproducing or duplicating.
Descriptive Research : to obtain pertinent and precise information concerning the current status of phenomena.
Correlation : Determining the extent of relationship existing between variables.
Manipulate : The deliberate alteration of a variable (Independent Variable) by a researcher to observe its effect on another variable(Dependent Variable).

1.11 **Self –Assessment Questions**

Elucidate the concept of Quantitative Research.
Explain the various characteristics of Quantitative Research.
Describe the value of quantitative research in education.
Describe the nature of quantitative research.

1.12 Suggested Further Readings

Koul, Lokesh : Methodology of Educational Research
Aggarwal Y.P; The science of Educational Research
Kumar. R (2006) Research Methodology, New Delhi; Dorling Kingsley
Grinnell, Richard Jr (ed) 1988, social work Research and Evaluation (3rd edition) Itasca, Illinois, F.E.Peacock Publishers

HISTORICAL RESEARCH (CONCEPT, STEPS, TYPES, MERITS &DEMERITS
Unit-I **Lesson : 2**

STRUCTURE

2.1 INTRODUCTION

Research methods are of utmost importance in a research process. They describe the various steps of the plan of attack to be adopted in solving a research problem, such as the manner in which the problems are formulated, the definition of terms, the choice of subjects for investigation, the validation of data-gathering tools, the collection analysis and interpretation of data, and the processes of inferences and generalizations.

Research methods may be classified on three basic categories;

7. *Historical Method*: Which provides a method of investigation to discover describe and interpret what existed in the past.

8. *Descriptive Method*: Which provides a method of investigation to duty, describe and interpret what exists at present.

9. *Experimental Method*: Which provides a method of investigation to five basic relationship among phenomena under controlled conditions of more simply, to identify the conditions underlying the occurrence of a then phenomenon.

The selection of a method and the specific design within that method appropriate in investigating a research problem will depend upon the kind data that the problem entail. However, the method selected should be in harmony with scientific principles and adequate enough to lead to dependable generalization. In any specific study, although it is a common practice are any one of the above methods yet there is no reason why two or the methods cannot be applied effectively in combination in certain such situations. For example a

researcher may seek the solution of a problems by studying its history through an examination of documents and then determining, its present status by some sort of survey.

A researcher must have a thorough understanding of all researcher methods with particular reference to their strengths, limitations, applicability and appropriateness. It will help him to carefully plan the steps he will take in the research process and describe the method clearly before be actually starts working on the solution of the problem. A pre-planned and well-described method will provide the researcher a scientific and feasible plan for attacking and solving the problem under investigation. In this lesson you wil be acquainted with the various steps that a researcher will use while using historical research as a method for research.

2.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :

Explain the concept of historical research
Differentiate between history and historical research
Describe the nature of historical research
Explain the value of historical research in education
Explain the types of historical research
Describe the steps in historical research
Elucidate the merits and demerits of Historical research

2.3 CONCEPT OF HSITORICAL RESEARCH

History is a meaningful and an organised record of past events. It is not merely a list of events arranged chronologically, but a valid integrated account of social, cultural, economic and political forces that had operated simultaneously to produce a historical event. Education too, has a history of its own which has progressed under the influence of such forces that had operated simultaneously to produce a historical event. Education too, has a history of its own which has progressed under the influence of such forces. An understanding of the historical background of education would enable the educator to recognize the ills of most educational practices which were tried in the past and found wanting.

NATURE OF HISTORICAL RESEARCH

Historical research attempts to establish facts so as to arrive at conclusion concerning past events. This is usually accompanied by an interpretation of these events and of their relevance to present circumstances and who might happen in the future. The main purpose of historical research therefore, is to arrive at an accurate account of the past so as to gain a clear perspective of the present. This knowledge enables us at least partially to predict and control our future existence. Historical research as any other type of research, includes the

delimitation of a problem, formulating hypotheses or tentative generalization gathering and analyzing data, and arriving at conclusions or generalization based upon deductive-inductive reasoning. However, the historian face greater difficulties than researchers in any other field. He according to a Ary et al (1972,p.283), lacks control over both treatment and measurement of data, has relatively little control over sampling, and has no opportunity for replication. The historian handles data of unique type. They are mainly traces of past events in the form of documents, relics, records etc. having a direct or indirect impact on the event under study.

The job of the historian becomes more complicated when he derives truth from historical evidence. The major difficulty lies in the fact that the data on which historical research is based are invariably relatively inadequate and at times the study is conducted with all of the independability that the data may entail. According to best (1977, p.344):

The historian must depend upon the reported observation of others, often witnesses of doubtful competence and sometimes of doubtful objectivity.

These obviously pose difficulty in matters of objectivity of interpretation.

The data of occurrence of a certain historical event is another difficulty it may be difficult to determine it partly because of changes brought out in the system of calender and partly due to incomplete information.

2.3.1 CHECK YOUR PROGRESS 1

Write your answer in the space given below:

Q1. Explain the concept of Historical Research in your own words.

Q2. Discuss the nature of Historical Research .

2.4 STEPS IN HISTORICAL RESEARCH

The steps involved in undertaking a historical research are not different from other forms of research, but the nature of the subject matter presents a researcher some peculiar problems and requires him a apply some special standards and techniques. In general, historical research involves the following steps.

1. Selection of the problem

2. Formulation of hypotheses
3. Collection of data
4. Criticism of data
5. Interpretation and reporting of findings

Selection of the Problem

In the process of selection of a problem a researcher may select a problem pertaining to the history of individuals, institutions, organizations, law, curriculum, administration, textbooks, teacher education, equipment, important concepts and thoughts that have influenced education during a specific period of time in a given nature of sub-culture determined by religion caste, sex, age or work. He may delimit his study to an era of events in a local, regional, or national setting, or he may study the trend of events in different areas, different cities or different cultures. The historian may discover new knowledge, the meaning of which, when interpreted will provide answers about past events. Sometimes he may doubt an old Interpretation of existing data and then attempts to provide a more satisfactory explanation of past events.

The researcher should exercise due care in selecting and delimiting the historical problem for investigation. He should check that the problem selected should not only be of historical and current significance but answerable by available method of research and by the available sources of data. Sometimes many worthwhile topics of historical importance may have to be discarded when adequate data are not available.

Formulation of Hypotheses

The hypotheses that the researcher constructs for historical research are useful in explaining events, condition or phenomena of the historical period in question. Sometimes it is argued that in such type of studies a researcher is merely interested in concrete events in their singularity, he has merely to check the validity and authenticity of facts about past events and arrange them in a chronological sequence. Therefore, the researcher may not formulates any hypotheses in such investigation. But the finding based on unstated hypotheses are ambiguous and do not explain or describe the structural interrelations of the phenomena under study. The reports of such findings relate what happened in the past but do not explain how and why the events occurred in a particular sequence.

However, it must noted that the hypotheses for historical research may not be formal hypotheses to be tested. Rather, they are written as explicit statements that tentatively explain the occurrence of events and conditions.

While formulating hypotheses, a researcher may formulate question that are most appropriate for the past events he is investigating and then directs his research towards seeking answers to these questions with the help of evidences.

Collection of Data

After the problem has been selected and stated and appropriate hypotheses or question have been formulated the researcher has to collect all the data available so that hypotheses may be thoroughly verified. The collection of data in historical research is a tedious and time consuming process. The researcher usually sifts through the vast material of human activity that testify about past events and from these he identifies and selects data that are relevant to his problem. These data are classified into primary and secondary sources. It is important for

a researcher to distinguish between them and develop skill in locating them. The detailed explanation about primary and secondary sources will be discussed in the next chapter.

Criticism of data

After the data have been identified, the researcher must learn to read them correctly as a basis for developing sound ideas of the past, which in turn may help in interpreting present trends and possibly in predicting future events. For this his researcher subjects his data to rigorous evaluation, which is known as criticism of the data. It involves the dual processes of establishing the authenticity of the source and of establishing the validity of its contents.

The process of establishing authenticity of the data is termed as external criticism and that of establishing the validity of their content is turned as internal criticism. The process of external criticism and internal criticism will be elaborately discussed in the next chapter.

Interpretation of Data

After the data have been collected and criticized, the researcher turns himself to the task of interpretation of these data in the light of his problem. Because of the unique nature of the historical data, the task of interpretation becomes complicated and acquires special significance. It requires greatest ingenuity and imagination on the part of the researcher.

Writing of the Research Report

After the data have been interpreted, the research has to write a well-organized report of his study. The report of the historical research includes a statement of the problem, a review of the literature, the statement of the objectives and research questions, survey and sources of data and method of its collection organization of heads of classification and ordering of data, the criticism, analysis and interpretation of data, the conclusions reached and a bibliography. The writing of historical research report needs the highest level of scholarship on the part of the researcher. This is a matter of expositional strategy which calls for creativity in addition to the qualities of imagination and ingenuity. The researcher must be elegant and objective in his style of writing the research report. However because of the discontinuous and incomplete nature of historical data on which valid generalizations can be established it is generally accepted that in writing of historical research report, the researcher has to be permitted a little more freedom on the subjective interpretation of data. At the same time, it must be ensured that the presentation is sufficiently systematic and does not hide or distort the truth.

Self Assessment Questions

1) A researcher may select a problem pertaining to the history of individuals during a specific period.

(True/False)

2) The hypothesis for historical research are written as explicit statements that tentatively explain the occurrence of events. (True/False)

3) Writing of the Research Report is not important in historical research. (True/False)

4) The researcher should not exercise due care in selecting and delimiting the historical problem for investigation. (True/False)

Answers

(1) True (2) True (3) False (4) False

2.5 TYPES OF HISTORICAL RESEARCH

Education has a history that needs to be studied in scholarly detail. Historical studies that could be conducted with profit to the field of education may include the following:

9. Bibliographic research.
10. Legal research.
11. Studying the history of ideas.
12. Studying the history of institutions and organizations.

Bibliographic Research

Bibliographic research aims at determining and presenting truthfully the important facts about the life, character, and achievements of important educators. In Indian context one may study the contribution of Gandhiji, Tagore and other leading educationists and their influence on current educational practice and thought.

Legal Research

Legal research is of immense value and interest to educational administrators. It aims to study the legal basis of educational institutions run by different religions and castes, relation between central and state governments with regard to education, legal status of teachers and students, administration of private aided schools, school finance, participation of students in

the administration of universities, etc. Legal research needs official training in the field of law, and any one without this training is not competent to do this type of research.

Studying the History of ideas

Studying the history of ideas involves the tracing of major philosophical or scientific thoughts from their origins through their different stages of development. It also aims at tracing of changes in popular thoughts and attitudes over a given period of time. The evolution of current concepts like team teaching, the problem-solving approach, mastery-learning approach, etc. provide important topics of historical research.

Studying the History of institutions and Organizations

Studying the history of some prominent schools, universities and other educational institutions also provide numerous problems for significant historical research. When studying such history, the same general method applies as for the study of an educator's life. In India for example, one may study the history of the growth and development of Vishwa Bharti University.

Activity
Make a list of some research studies where the researcher has used historical method as an investigation tool. Also justify the choice that you have selected for the study.

2.6 Merits of Historical Research

Historical research has great value in the field of educational research because it is necessary to know and understand educational achievements and trends of the past in order to gain perspective on present and future directions. Knight (1934), as quoted by good, Barr and scates (1941,p.41) has given the following analysis of the value of historical research:

- A knowledge of the history of schools and other educational agencies is an important part of the professional training of the teacher or the school administrator.
- This knowledge helps in understanding of dynamics of educational change.
- It develops increased understanding of the relationship between education and the culture in which it operates.
- It is useful in making inquiry into the past and reconstruct it.
- Only in the light of their origin and growth can the numerous educational problems of the present be viewed sympathetically and without bias by the teacher, their school administrator, or the public.
- The history of education shows how the functions of social institution shift and how the support and control of education have changed from very simple and local arrangements to those that are now somewhat centralized and complex.

- The history of education in an ally in the scientific study of education rather than a competition. It serves to present the educational ideals and standards of other times, and it enables social workers to avoid mistake of the past.
- It inspires respect for sound scholarship and reverence for great teachers.
- It helps us to develop increased understanding of contemporary educational problems.
- It helps to shed light upon present and future trends of events.
- It is useful to test and evaluate the present day notions, facts, theories and generalizations which people hold about the past and
- To plan future action in the light of the past events.

The students and teachers in the discipline of education can develop the following competencies through a study of history and conducting of historical research.

- Understanding of dynamics of educational change
- Increased understanding of the relationship between education and the culture in which it operates,
- Increased understanding of contemporary educational problems.
- Understanding the functions and limitations of historical evidence in analyzing educational problems.
- Development of elementary ability in locating, analyzing and appraising historical evidence, and
- Development of a sense of dignity and responsibility of the teaching profession.

2.7 Demerits of Historical Research

Historical research suffers from several limitations, some inherent in the very nature of the subject and others extraneous to it and concerning the capabilities required in the researcher. Some of the limitations of this research are enumerated below:

Good historical research is not easy. It is slow, painstaking and exacting. An average researcher finds it difficult to cope with these requirements.

Historical research requires a great commitment to methodological scholarly activity.

Sources of data in historical research, are not available for the direct scrutiny of the researcher and historical evidence is, by and large, incomplete.

The problem of interpretation of data is very complex. There is likely to be a lot of difference in a police officer's and a social worker's understanding and interpretation of a communal riot.

Through historical research, predictions for the future are difficult to make.

The scientific method which essentially requires the use of the process of observation,

hypothesis and experiment cannot be applied to the historical evidence.
The modern electronic aids like computers have not contributed as much to historical and philosophical research as to other empirical research.
Historical research requires a high level of scholarship, language skills and art of writing on the part of the researcher which is generally not available in an average student.
It is not possible to construct 'historical laws 'and 'historical theories' like laws of science and even theories in economics, sociology and psychology.
The man is more concerned with the present and the future and has a tendency to ignore the past as important.
The limitations of historical research are further evident from the following:
A historian can generalize but not predict; can anticipate but not predict; can take precautions but not controls; can talk of possibilities but not probabilities.

_____

2.7.1 CHECK YOUR PROGRESS 2

_____

Note : (a) Write your answers in the space given below.
(b) Compare your answers with those given at the end of the lesson/ above sub-section.
1. Fill in the blanks :
(i) Research methods are of utmost _____ in a research process.
(ii) Name the three basic categories of Research methods –
_____, _____, _____
(iii) History is a meaningful and an _____ record of past events.
(iv) Historical research attempts to establish _____so as to arrive at _____ concerning _____.
(v) _____ is the first step in Historical Research.
2. What is Bibliographic Research ?
_____
_____
3. What is the aim of Legal Research in Educational institutions?
_____
_____
_____

2.8 Let us Sum up

_____

From the above discussion, we conclude that History deals with past and embraces the entire field of the human past. It is as broad as the life itself and its scope is not restricted to only one aspect or happening in the life of an individual, a group or the whole society. Historical research to a great extent follows the scientific method. However the procedure required in this type of research differs from survey and experimental research. This is obviously due to

the fact that the nature of data or facts with which the historical researcher deals is different from those with which the survey researcher or experimenter is concerned. Hence some of the steps in all these types of researches are similar while other, different. The steps involved in Historical research are selection of a broad field , identification of a specific problem, formulation of the problem, selection of sources of historical evidence, collection of historical evidence, interpretation of data and preparation of Report.

2.9 KEY WORDS / GLOSSARY

Historical Research : Method of investigation to discover, describe and interpret what existed in the past.
Descriptive Method : A method of investigation which describe and interpret what exists at present.
Research : A detailed and careful study of a phenomena to acquire more information;
Generalization : Taking one or a few facts and making a broader, more universal statement;
Sampling : Selecting a group for collection of data related to Research problem; A sample refers to a smaller, manageable version of a larger group;
Replication in Research : Repeating a study, or part of a study, to verify the findings of an original investigation ; copy, reproduction: the action or process of reproducing or duplicating ;

2.10 **Self –Assessment Questions**

1. Describe the nature of Historical Research.
2. Describe the value of Historical Research in education.
3. List and describe the types of Historical Research.
4. What considerations should a researcher follow while writing a research report ?
5. Explain various steps conducting a Historical Research in education.

2.11 SUGGESTED FURTHER READINGS

S.S.Mathur “Researcher in Philosophy of Education” in Aggarwal, Y.P.(Edu.) Research in Emerging fields of Education New Delhi: Sterling
H.G.Good “Historical research in Education”

Koul Lokesh; Methodology of Educational Research.
Aggarwal Y.P; The science of Educational Research –A source Book.

PRIMARY AND SECONDARY SOURCES OF DATA
EXTERNAL AND INTERNAL CRITICISM OF THE SOURCES

Unit I **Lesson No. 3**

STRUCTURE

3.1 NTRODUCTION

In the foregoing chapters we have discussed about meaning and areas of educational research, and the various stages that the researcher has to undergo while planning and conducting a research study. The researcher first selects the area of research, and the various stages that the researcher has to undergo while planning and conducting a research study.

One of the important step for the researcher while conducting the research is collection of data. The researcher usually sifts through the vast materials of human activity that testify about past events, and from these he identifies and selects data that are relevant to his problem. These data are classified into primary and secondary sources. It is important for a researcher to distinguish between them and develop skill in locating them.

3.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to:

- Explain various forms of data

- Explain the primary sources of data
- Describe the value of secondary sources of data
- Explain the process of criticism of data
- Describe the external criticism of data
- Explain the internal criticism of data

3.3 PRIMARY SOURCES OF DATA

Primary sources are eye witness accounts and are the only solid based of historical enquiry. Good, Barr and Scates (1941, p.253) have collected them as the 'first witnesses to a fact'. The original documents or remains come under the category of primary sources. They are available in written pictorial and mechanical forms as under.

Personal records like certificates, diaries, autobiographies, affidavits, declarations, letters, wills, deed, contracts and original drafts of speeches articles books and pamphlets.

Official records legislative, judicial, or executive documents prepared by central or state government, municipalities, panchayats or other local bodies, such as constitutions, laws, charters, court proceedings and decisions, the data preserved by missionaries and other religious organizations such as financial records and records of the minutes of the meetings of managing or governing bodies; the information compiled by central or state education departments, special commissions, professional organizations, school boards, administrative authorities, such as the minutes of meetings, reports of committees and commissions, administrative orders, school surveys, annual reports ,budget attendance records, cumulative records of dramas, games, musical and athletic events, and examinations.

Oral testimony of traditions and events. Myths, folk tales, family stories, ceremonies, spoken account of a witness of an event, interviews with administrators, teachers, students, parents or guardians, school patrons and prominent educationists.

Pictorial records, photographs, movies, micro-films, drawings, paintings, coins, and sculpture.

Remains or relics. Fossils, skeletons, tools, weapons, clothing, buildings, furniture, utensils, art objects, teaching materials, samples of examination question papers, samples of student work, and murals .

9.3.1 CHECK YOUR PROGRESS 1

Write your answers in the space given below :

Q1. What do you mean by Primary Sources of data ? Illustrate your answer with examples.

Q2. Differentiate between Personal Records and Official Records.

3.4 SECONDARY SOURCES OF DATA

Secondary sources are the accounts of an event provided by a person who did not directly observe the event, object, or condition. The person may have directly contacted an actual observer and talked with him or read an account by an observer. Since the testimony of the person is not that of an actual participant or observer secondary sources are subject to an informant danger of inaccuracy and distortion. For this reason, the researcher should rely as much as possible on primary sources and use the secondary sources only to bridge the gaps between the various pieces of primary data.

At times however. It is not always possible to obtain primary data and in such situations the researcher may have to rely on secondary sources. These situations, according to Mouly (1963, p.208), are frequent in education where only fragmentary reports concerning the processes of education are available. He is of the opinion that people in the past considered education so trivial that they did not bother recording anything about its nature or its organizations and consequently, it is relatively difficult to identify suitable primary data to permit the conduct of a good historical research in education. The personal documents as diaries and personal letters also leave wide gaps for the researcher to get the required continuity without resorting to secondary sources.

Secondary sources if used carefully, serve many useful purposes. They may acquaint a researcher to major theoretical issues in his field and to the work that has been done in the area under study. They may suggest possible solutions of the problem and working hypotheses and may introduce the researcher to important primary sources.

A rigid classification of source material is not always possible and practicable. Some type of data may be primary sources for some purposes and secondary source for another. For example, a high school textbook in Indian history will be classified ordinarily a secondary source. But if one making a study of the changing emphasis on national integration in high school history textbooks, the book would be a primary source of data.

In the location of source materials in historical research, the card catalog, periodical indexes, bibliographies, historical reviews, research journals provide helpful guides.

Activity
Check whether the following are primary sources of data (P) or Secondary sources of data (S) :

1) Original drafts of speeches (P) (S)
2) In the location of source materials in historical research, the historical reviews are (P) (S)
3) Pictorial records like photographs etc. (P) (S)
4) Oral testimony of traditions and events like myths and folk tales are (P) (S)

ANSWERS

(1) P (2) S (3) P (4) P

3.5 CRITICSM OF THE DATA

After the data have been identified, the researcher must learn to read them correctly as a basis for developing sound ideas of the past, which in turn may help in interpreting present trends and possibly in predicting future events. For this the researcher subjects his data to rigorous evaluation, which is known as criticism of the data. It involves the dual processes of establishing the authenticity of the source and of establishing the validity of its contents.
The process of establishing authenticity of the data is termed as external criticism and that of establishing the validity of their content is turned as internal criticism.

3.6 EXTERNAL CRITICISM OF DATA

External criticism, also called as lower criticism, checks the genuine ness and authenticity of the source material. It helps to determine whether it is what it appears or claims to be and whether it reads true to be original so as to save the researcher from being the victim of a fraud. The purpose of external criticism according to Mouly (1963,p.210), is, however, not so much 'negative' that is, the detection of fraud-as it is the establishment of historical truth. To determine the genuineness of the historical data, a researcher must possess a rich fund of historical and general knowledge. According to Vandalen (1973,p.168) he also needs 'a good chronological sense, a versatile collect, good common sense, an intelligent understanding of human behaviour, and good plenty of patience and persistence'. The problem of establishing age or authorship of a document may involve such techniques as authentication of signatures,

handwriting, script and type; chemical analysis of paint, carbon dating of artifacts, ink, paper, cloth, stone, metals or wood. The researcher, therefore must be familiar with chemistry, archeology, cartography, art, literature, philology, anthropology, paleography, or various modern and ancient languages. If he does not have a knowledge of these fields, he may acquire special training in the fields that are most closely related to his historical problem or may seek the help of impotent experts in the field.

3.7 INTERNAL CRITICISM OF DATA

After the authenticity of his historical data has been established, the researcher proceeds to internal criticism. It is also called as higher criticism and is concerned with the validity, credibility, or worth of the content of the document. Besides the textual criticism, it also involves such factors as competence, good faith, bias and general reputation of the author. Internal criticism is positive in nature when the researcher seeks to discover theliteral and the real meaning of the text. It is negative when the researcher to seek every possible reason for disbelieving the statement made, questioning critically the competence, truthfulness or accuracy, and honesty of the author. Good Barr and Scates (1941,p.262)are of the opinion the both positive and negative criticism are essential in historical research but the researcher should not go so far as to be cynical and hypercritical.

The competence and accuracy of an author is evaluated in relation to his status as a trained eye witness, presence of emotional stress or pressure that might influence the observation and the extent to which the conditions for observing were favourable. It is also evaluated in terms of the time period that has elapsed between the event and its recording by the author so as to ascertain whether the author was able to remember accurately the account of the event.

The author of a documents may know the truth, but for certain reason he may report the evidence only in part or in a distorted form. Distortion of the fact may result from author's motive, bias or prejudice. It may also result from his personal vanity or ambition, literary artifice, known ignorance about the subject, known weakness of telling lies or half-truths, desire to flatter his superiors, desire to please the public, political or religious views or vested interest

The validity of a historical fact contained in a document can sometimes be evaluated by comparing it with the statements of their author. When there is disagreement among authors, the researcher must establish which one is correct. This he must do on the basis of overall credibility reputation, independent authentication and general consistency with other known facts.

3.7.1 CHECK YOUR PROGRESS 2

Note : (a) Write your answers in the space given below.
(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. Fill in the blanks :-

(a) Sources of historical evidence may be classified as _____ and _____.

(b) In educational research text books and note books used by the students as long as preserved in original can be classified as _____.

(c) Those persons which were not direct observers in the events of the past are _____.

(d) The researcher subjects his data to rigorous evaluation, which is known as _____criticism of the data.

(e) External criticism checks the _____ and _____ of the source material.

2. What do you mean by criticism of data ?

_____

_____

3. Name various primary sources of data.

_____

_____

_____

3.8 LET US SUM UP

From the above discussion, we conclude that the researcher has to identify and select data through the vast materials of human activity relevant to his problem. The data he has to go through may be in the form of physical remains like roads, buildings etc. or orally transmitted material, or hand-written material etc. of the past events. The sources that he identifies may be primary sources or secondary sources. A primary source is the written or oral testimony of an eyewitnesses or a participant, or a record made by some mechanical device present at the event. Secondary sources are those persons, objects and documents which were not direct observers or participants in the events of the past.

The historical data for evidence collected by the historian must be subjected to a critical and evaluative analysis which is termed as historical criticism. Historical criticism is of two types- external criticism and internal criticism. External criticism is concerned with the establishment of the authenticity or genuineness of the document or relic. After the authenticity of the document has been established, it is put to internal criticism. Internal criticism deals with the meaning and trustworthiness of the statements contained in the document. Thus the process of establishing authenticity of the data is termed as external criticism and that of establishing the validity of their content is termed as internal criticism.

3.9 KEY WORDS / GLOSSARY

Primary sources : Eye witness records ; original documents or remains .
Relics : An object, tradition etc. from the past that still survives today e.g. fossils .
Oral Testimony: Evidence presented verbally; spoken account of a witness of an event.
Secondary Sources : The material that interpret, analyze or comment on primary sources ; the accounts of an event provided by a person who did not directly observe the event, object or condition

3.10 **Self –Assessment Questions**

1. How is Historical evidence validated in historical research?
2. Explain by giving examples, the primary and secondary sources of data.
3. Describe the process of external and internal criticism of historical data.

3.11 SUGGESTED FURTHER READINGS

H.G.Good “Historical research in Education”
S.S.Mathur “Researches in philosophy of Education” in Aggarwal, Y.P.(Edu.) Research in Emerging fields of Education New Delhi : Sterling
Koul Lokesh; Methodology of Education Research
Aggarwal Y.P; the science of Educational Research ,A source Book.

DESCRIPTIVE RESEARCH
(CONCEPT,STEPS, MERITS AND DEMERITS)

Unit I **Lesson ; 4**

STRUCTURE

4.1 INTRODUCTION

Human knowledge as it exists today broadly consists of facts and theories. New facts, new concepts and new ways of doing things increased its quantum with the passage of time. This knowledge enables us to understand, comprehend, explain, control, predict or cope with a given situation. The sources from which we obtain knowledge range from unreliable to reliable. The reliable knowledge is based on objective verification of generalizations. The acquisition of knowledge requires constant and planned effort by intelligent and highly trained people. The present level of knowledge is an outcome of the various researches conducted and various methods adopted by man over a period of several centuries.

The choice of the method of research is determined by the nature of the problem. Historical method can tell us much about what existed in the past by determining, evaluating and understanding past events. Descriptive methods can tell us about what exists at present by determining the nature and degree of existing conditions. Because of the methods apparent case and directness, descriptive method has undoubtedly been the most popular and most widely used research method in education.

4.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :

- Explain the nature of descriptive research
- Describe the value of Descriptive Research in Education
- Enumerate the steps of Descriptive Research
- List and describe the various types of Descriptive Research
- Describe the nature of survey studies
- Explain the nature of co-relation studies
- Describe the nature of causal comparative studies

4.3 NATURE OF DESCRIPTIVE RESEARCH

Descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and, whenever possible, to draw valid general conclusions from the facts discovered. Descriptive studies are more than just a collection of data; they involve measurement, classification, analysis, comparison, and interpretation. They collect and provide three types of information; (1) of what exists with respect to variables or conditions in a situation; (2) of what we want by identifying standards or norms with which to compare the present conditions or what experts consider to be desirable, and (3) of how to achieve goals by exploring possible ways and means on the basis of the experience of others or the opinions of experts.

The activities of descriptive studies researchers are not different from those of the other researchers. As in any study they (1) identify and define their problem ; (2) state their objectives and hypotheses; (3) list the assumptions upon which their hypotheses and procedures are based; (4) choose appropriate subjects and source materials ;(5) select or construct tools for collecting data; (6) specify categories of data that are relevant for the purpose of study, and capable of bringing out significant similarities, differences, or relationships; (7) describe, analyze and interpret their data in clear and precise terms; and (8) draw significant and meaningful conclusions.

Descriptive studies investigate phenomena in their natural setting. Their purpose is both immediate and long range. They constitute a primitive type of research and do not aspire to develop an organized body of scientific laws. Such studies, however, provide information useful to the solution of local problems and at times provide data to form the basis of research of a more fundamental nature.

4.4 VALUE OF DESCRIPTIVE RESEARCH IN EDUCATION

The descriptive research method has undoubtedly been the most popular and the most widely used research method in education. It helps to explain educational phenomena in terms of the conditions or relationships that exist, opinions that are held by the students, teachers, parents and experts, processes that are going on, effects that are evident, or trends that are developing. Because of the apparent case and directness of this method, a researcher can gather information in terms of individual's opinion about some issue, by a simple questionnaire. At times, descriptive survey is the only means through which opinions, attitudes, suggestions for improvement of educational practices and instruction, and other data can be obtained.

The descriptive investigations are of immense value in solving problems about children, school organization, supervision and administration, curriculum, teaching methods and evaluation. There are a number of questions that arise concerning theses aspects of education. For example, the head of a school may wish to know how other school systems are being run, so that he can compare his practices with theirs. This way he will be able to know what procedures and standards are superior to those of other schools. The teachers will also study the conditions existing in their classrooms and that of other teachers.

The descriptive type of research is useful in the development of data gathering instruments and tools like checklists, schedules, questionnaires and rating scales. It also provides the background ideas and data from which many more refined or controlled studies of casual relations are made.

Activity
Make a list of some research studies where descriptive research is used in solving problems in education. Also justify your answer by reasoning out your choice of selection.

4.5 STEPS OF DESCRIPTIVE RESEARCH

The researcher may adopt the following steps:

Selection of the problem

A researcher may be concerned with conditions or relationships that exist, practices that prevail, beliefs, points of view or attitudes that are held, processes that are going on, effects that are being felt or trends that are developing, and may select the problem accordingly from the area or field in which he is interested.

Statement and Definition of the problem

The researcher must state the problem clearly and identify the variables involved in the study.

Identification of Data

After stating and defining the problem, the next step for the researcher is to list the data to be collected for the study. He has to specify whether the data are of qualitative or quantitative in nature and whether the data will be collected in the forms of counts, test scores, responses to questionnaires, interviews and so on.

Selection or Development of Tools

The nature of the data to be collected helps the researcher to select the appropriate tools for the study. If the ready- made tools are not available, the researcher has to develop his own tools. Questionnaires, interviews, psychological tests, rating scales, schedules and attitude scales are the most frequently used tools for descriptive research. If the researcher uses ready-made tools, he should satisfy himself about their reliability, validity, and suitability for sample chosen for the study. If the researcher develops his own tools, he should try them out with a small group in order to evaluate them and make modifications if necessary.

Selection of the sample

The researcher must select the sample about which he wishes to seek information using appropriate sampling techniques. The sample selected should adequately represent the population.

Collection of Data

The researcher should specify the practical schedule for gathering the data from the sample selected for the study with the help of appropriate tools.

Analysis and Interpretation of Data

The data collected is quantified in the form of counts, test scores, responses to questionnaires, etc. These are analysed and interpreted with the help of appropriate parametric or non-parametric statistical tests and qualitative techniques.

Writing of the Research Report

It is the last stage in the descriptive research as in any other form of research. The researcher should exercise extreme caution in generalizing conclusions and reporting them with all the limitations of the study.

4..5.1 CHECK YOUR PROGRESS 1

Write your answers in the space given below :

Q1. Explain the value of Descriptive Research in Education.

Q2. Enlist the steps of Descriptive Research. Explain elaborately any three steps of Descriptive Research in your own words.

4.6 Types of Descriptive Research

Descriptive studies have been classified variously by various writers. These classifications mostly range from the survey, which describes the status quo of educational variables, to the

correlational study, which investigates the relationships between variables.

Survey studies

Survey studies are conducted to collect detailed description of existing phenomena with the intent of employing data to justify current conditions and practices or to make more intelligent plans for improving them. Survey studies may take different forms depending upon the scope, nature and purpose of the problem under investigation. Their objective is not only to analyze, interpret, and report the status of an institution, group, or area in order to guide practice in the immediate future, but also to determine the adequacy of status by comparing it with established standards.

Survey studies describe and specify the properties of educational phenomena. They include: school surveys, job analysis, public opinion surveys, and social surveys.

School surveys generally is a comprehensive study of existing conditions. Its main purpose is to determine the overall effectiveness of the school programme and suggest improvement where necessary. The scope of school surveys is large and varied. A single comprehensive school surey may be comprised of various parts or constituent surveys. These include: survey testing, school appraisal, status studies, financial studies, curriculum studies and building surveys.

Job analysis- The method of job analysis is generally used in business and industry. In education , it is employed to gather information about the general duties and responsibilities of the teaching, non-teaching and administrative personnel, the specific duties that they perform, their working conditions, the nature and type of their facilities and their status and relationship in the administrative organization. These data help the researchers to get knowledge about the existing practices and conditions of employment, and the competencies and behavioural traits that the personnel possess or should possess to carry out their work effectively and efficiently.

Public opinion surveys- In order to make some important and crucial decisions, industrial, political, educational and other leaders seek knowledge of the public's opinions, attitudes and preferences. In these surveys the researchers usually make use of questionnaires, schedules or interviews to gather data from the selected group or groups following appropriate sampling procedures.

Social surveys – Social surveys are also called community surveys. These surveys are generally undertaken to study health services, employment conditions, causes of juvenile delinquency, housing problems, or caste discriminations. The research tools that are used in this research ae questionnaires, schedules, interviews, rating scales and direct observations etc.

Activity
Prepare the report of any one survey that you have conucted. Also identify whether you have used direct observation(face to face interview) or indirect observation (such as opinions on library services of an institute) to conduct it.

Descriptive Studies and its types

A descriptive study is one that is designed to describe the distribution of one or more variables, without regard, to any causal or other hypothesis. Descriptive studies can be of several types namely case reports, case series, cross-sectional studies and ecological studies. In the first three of these, data are collected on individuals, whereas the last one uses aggregated data for groups.

Case study – is an intensive investigation of a social unit which may be an individual, a family, a school, a group of delinquents, drop outs or any teenage gang. Guidance and counsellors and social workers conduct case studies for diagnosing a particular condition or problem and recommending therapeutic measures. The case studies in general are classified as descriptive research types, they have sometimes been conducted for purpose of hypothesis testing and taken the form of experimental research. The following steps are involved in the conduct of the case study.

- The first step is to determine the present status of the individual or the social unit under investigation through direct observation of measurement.
- The next step is to determine the most probable antecedents of the case and to formulate hypothesis or a set of hypotheses through the knowledge of similar cases.
- The third step is verification of the hypothesis. Here the researcher makes use of the knowledge of the present status and the history of the case.
- After verification of the hypothesis, the next step is directed towards further validation of the diagnosis.
- The last step of the case study is the follow up of the case.

Advantages

- The case study attempts to understand an individual or a unit in depth.
- The case study often provides an opportunity for a researcher to develop insight into basic aspects of human behavior.
- The case study helps the researcher to observe events both within and outside the educational setting in their totality.
- A case study may provide insights that will help a researcher to formulate fruitful hypothesis or a set of hypotheses.

Limitations

- The case study data are subjective.
- Although case study method attempts to examine an individual in depth, it inevitably lacks breadth.
- It is impossible to either confirm or refute through empirical study the findings and results of a particular case study.
- A worthwhile case study can rarely be completed by a single individual.

Self Assessment

1) Case study means single and _____ case studies.
2) Case studies based on any evidence of quantitative and _____ research.
3) _____ is the last step of case study.

ANSWERS
(1) multiple (2) qualitative (3) follow-up

Causal-comparative studies - In some investigations, the researcher attempts to explore not only what a phenomenon is like, but how and why it occurs, In such cases, the aim of the researcher is to compare the likeness and differences among phenomena to discover what factors or circumstances seem to accompany or contribute to the occurrence of certain events, conditions and practices. Causal-comparative studies are employed when a researcher cannot manipulate the independent variable and establish the controls that are required in experiments. If a researcher, for example, wants to study emotional stability, he cannot manipulate the home background, socio- economic stability, he cannot manipulate the home background, socio economic status, or intelligence of children and cannot place children in a situation where all factors are kept constant except one variable which is manipulated to determine what causes a particular type of emotional instability. Rather he selects children who, according to a criterion are emotionally instable and compares them with a group of emotional stable children. After analyzing the data he may be able to identify the factors or conditions associated with the group of emotionally disturbed children and, therefore, present a possible explanation of the underlying causes of the emotional instability.
Causal-comparative method of research is useful in the situations when the experimental method is impractical or costly in time, money and effort. In some situations, ethical considerations may prevent a researcher to use experimentation as a method of investigation.
Limitations of causal comparative studies- This study suffer from some limitations:

- Lack of control is the serious limitation of this method of research.
- It is usually difficult to identify the relevant factors causing a particular condition or phenomenon.
- When a relationship between variables is established, it is difficult to determine which is the cause and which is the effect.
- The classification of subjects into dichotomous groups for the purpose of comparison also presents problems.
- In comparative studies of natural situations, the researcher does not have the same control over the selection of subjects as he has in experimental studies. It is difficult to identify existing groups of subjects who are alike in all respects except for their exposure to one variable.

Correlation studies – Correlation studies are a frequently used types of descriptive research concerned with determining the extent of relationship existing between variables. They are

used to obtain description of existing phenomenon and enable a researcher to ascertain the extent to which variations in one variable are associated with variations in another. The magnitude of the relationship is determined through the use of the coefficient of correlation. The correlation study is relatively easy to design and conduct. It involves the collection of two or more sets of measurement on a sample of subjects and computation of the coefficient of correlation between these sets of measurements. Several types of relationships can hold between the two sets of measurements. The direction of relationship may be positive or negative; the degree of relationship between the variables may vary from perfect, to high, to average, to no relationship; the relationship may be linear or curvilinear.

Ary et al. (1972. P. 302) have pointed that a researcher must consider the following points when interpreting the coefficient of correlation:

A coefficient of correlation is a simple number and it should not be interpreted ass percentage. A correlation coefficient gives a quantitative determination of the degree of relationship between two variables and it does not necessarily indicate a cause and effect relationship between two variables and it does not necessarily indicate a cause-and-effect relationship between them.

_____

4.6.1 CHECK YOUR PROGRESS 2

_____

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

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. State whether the following are True or False.

(a) Descriptive research studies are designed to obtain precise information concerning the current status phenomena (T/F)

(b) Descriptive investigations are not of immense value in solving problems about children. (T/F)

(c) Descriptive type of research is useful in the development of data gathering tools like checklists, questionnaires etc. (T/F)

(d) The comprehensive school survey does not cover the pupil transportation (T/F)

(e) In causal- comparative studies the researcher attempts to explore about the how and why a phenomena occurs. (T/F)

2. Describe the nature of survey studies.

_____

_____

3. List the various types of Descriptive Research in education .

_____

_____

-

_____

4.7 LET US SUM UP

From the above discussion we conclude that Descriptive research studies tell us about what exists at present by determining the nature and degree of existing conditions. These are designed to obtain pertinent and precise information concerning the current status of phenomena and whenever possible to draw valid general conclusions from the facts discovered. Descriptive Research is not directed towards hypothesis testing. These studies investigate phenomena in their natural settings. Descriptive Research differs from other types of research in purpose and scope. Descriptive research studies involve events that have already taken place and are related to a present condition. Descriptive research have been classified variously by various writers which mostly range from the survey, which describe the status-quo of educational variables, to the correlational study, which investigate the relationships between variables. Selection of the problem, statement and definition of the problem, identification of data, selection and development of tools, selection of the sample, collection of data, analysis and interpretation of data and writing of the Research Report are the various steps followed in Descriptive Research.

12.8 KEY WORDS / GLOSSARY

Hypotheses : An idea that is suggested as the possible explanation for something but has not yet been found to be true ; a tentative assumption made in order to draw out and test its logical or empirical consequences

Descriptive investigations : A type of scientific study that focusses on observing, describing or sometimes measuring natural systems.

Sample : a group of people , items or objects taken from a larger population ; a representative part or a single unit from a large whole or group presented for inspection or shown as evidence of quality

Survey : a study of the opinions, behaviour etc.of a group of people.

Analysis : the careful examination of the different parts or details of something.

Interpretation : an explanation or understanding of something.

4.9 Self –Assessment Questions

1. Describe the nature of Descriptive Research.
2. Describe the value of Descriptive Research.
3. List and describe the various types of Descriptive Research.
4. Elucidate the nature of Causal-comparative studies.
5. Explain the nature and purpose of cross-sectional studies.

4.10 SUGGESTED FURTHER READINGS

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EXPERIMENTAL RESEARCH

Unit – I **Lesson : 5**

STRUCTURE

5.1 INTRODUCTION

Research is one way of collecting and understanding information and finding answers to questions. Research is a way of thinking. The main purpose of research is developing and testing new theories for the enhancement of knowledge. In research we work within a framework of a set of theories, use methods and try to be unbiased and objective. Research is a scientific methodology in a controlled observation and experiments are the basic tool, which gives the status of science to a subject. It is a systematic attempt to study. Experimental research is mainly used in science subjects such as physics, chemistry, medicine, biology etc. Experiment requires two variables, one independent variable and the other dependent variable. It is important that in experimental research the independent variable is manipulated and the effect of manipulation is observed on the dependent variable. When we intend to do research, the first thing we have to do is to decide what research question we want to find answers to. There are various steps through which we just pass in our research journey in order to find the answers to our research questions. Conceptualizing a research design is one of the important steps in planning a research study. The main function of a research design is to explain how we will find answers to the research question.

5.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to :-

- Define experimental research
- List and describe the steps which the researcher may adopt in conducting the experimental type of research
- Define Research design
- Describe the functions of research design
- Identify the terms of research design
- List and explain different research designs
- Define Quasi- experimental design
- List and explain the validity of the design
- Define internal and external validity of the design

5.3 NATURE OF EXPERIMENTAL DESIGN

By experiment we refer to that portion of research in which variables are manipulated and their effects upon other variables are studied. The researcher deliberately manipulates some aspect of the experiment in which he is interested. He causes certain things to happen, and he observes how the condition is affected or changed. Although experimentation is the classic laboratory method of physics, chemistry, biology and other sciences, it has been effectively used in non-laboratory educational settings such as the class-room.

Experimental method provides for much control and , therefore, establishes a systematic and logical association between manipulated factors and observed effects. The researcher defines a problem and proposes a tentative answer or hypothesis. He tests the hypothesis and accepts or rejects it in the light of the controlled variable relationship that he has observed.

The early attempts at experimental designs which may be called as classical approach incorporated the manipulation of a single experimental variable as a time, control of all other variable. Fisher introduced experimental concepts and design of far-reaching applications and is said to be the father of modern experimental methods. The contributions of R.A.Fisher in terms of his concept of achieving pre-experimental equation of conditions through random selection of subjects and random assignment of treatments have provided an effective and sound method of conducting-realistic experiments with human beings. His techniques of analysis of variance and co-variance made it possible to study complex interactions through factorial designs.

There are four essential characteristics of experimental research: (i) Control; (ii) Manipulation;

(iii) Observation; and (iv) Replication.

Control- Control is the essential ingredient of experimental method. It refers to the extent to which different factors in an experiment are accounted for. Since more of the factors are accounted for with accuracy and more control is being enforced, the researcher has more confidence that his results are dependable.
Manipulation – Manipulation of a variable is another distinguishing characteristic of experimental research. It refers to a deliberate operation of the conditions by the researcher.
Observation- In experimental research, the researcher studies the effect of the manipulation of the independent variable on a dependent variable.
Replication- Replication is a matter of conducting a number of sub-experiments within the framework of an overall experimental design. The researcher, instead of comparing a single control case with a single experimental case, makes a multiple comparison of a number of cases of the control group and a number of cases of the experimental group, all within the same experimental framework.

Self assessment Questions

Fill in the blanks

1) Research problem can be stated in the form of _____.

2) The main task of an experimenter is to maximize the _____.

3) Research is a _____ methodology in a controlled setting.

4) _____ design is generally conducted in the laboratory with complete control over all variables and all subjects.

ANSWERS
(1) hypothesis (2) variance (3) scientific (4) Experimental

5.4 STEPS OF EXPERIMENTAL RESEARCH

The steps of the experimental method are not different from those of a scientific method. For the sake of clarification, the major steps may be described as under:
Surveying the literature relating to the problem
For a worthwhile research based on experimentation, the researcher needs to acquire up-to-date information relating to his problem.
Selecting and defining the problem

Experimental research starts with the selection of the problem which is amenable to experimentation. It needs a rigorous logical analysis and definition of the problem in precise terms. The variables to be studied should be defined in operational terms clearly .

Stating of Hypotheses

The stating of problem suggest that an antecedent condition or phenomenon (independent variable) is related to the occurrence of another condition, phenomenon, event, or effect (dependent variable). To test a hypothesis, the researcher attempts to control all the conditions except the independent variable which he manipulates.

Constructing the Experimental Plan

Experimental plan refers to the conceptual framework within which the experiment is conducted.

5.4.1 CHECK YOUR PROGRESS 1

Write your answers in the space given below :

Q1. Explain the nature of Experimental Design in your own words.

Q2. Enumerate the steps of Experimental Research .

5.5 EXPERIMENTAL RESEARCH DESIGN

An experimental design is to the researcher what a blueprint is to an architect. It provides the researcher an opportunity for the comparisons required by the hypotheses of the experiment and enables him to make a meaningful interpretation of the results of the study with the help of statistical analysis of the data.

Based on the presence, absence and the amount of controls possible the experimental DESIGNS can be classified as follows.

Pre-Experimental Designs

Pre-experimental Designs provide little or no control of extraneous or situation variables. They are however, still being used in the study of educational problems.

One Group Pre-test Post –test Design

When an experimenter uses this design, he measures dependent variable, before the

independent variable X is applied or withdrawn and then takes its measurement again afterwards. The difference in the measurements of dependent variable, if any, is computed and is taken as the amount of change as a result of the application or withdrawing of independent or treatment variable.

PARADIGM FOR THE DESIGN 1: One Group Pre-test Post Design

Pre Test	Independent variable	Post test
T1	X	T2
Mean of the criterion test	Teaching through programmed instruction	Mean of the criterion test

Limitations

Since the design involves only one group and one teacher, it seems to control inter subject differences and extraneous variables. The control, however, is superficial and does not check the threats to internal validity.

True- Experimental Designs

Campbell and Stanley recommends the following experimental design which is powerful enough to control most of the sources of confounding to great extent.

Pre-test Post-test Control Group Designs

Group	Pre-test	Treatment	Post-test
A (Random)	O1	X	O2
B (Random)	O3		O4

In which R stands for random formation of groups and their random assignment to experimental and control conditions. O1 to O4 denote observations. The randomization process used in the formation of the group and the presence of a comparison group control all the possible threats to the internal validity of the experiment. Hence it is the most widely used design in behavioural sciences research.

The Post-test only Control Group Design

Group	Pre-test	Treatment	Post-test
A (Random)		X	O1
B (Random)			O2

To eliminate the possibility of pre-test and treatment interaction effects, this design drops the pre-testing stage altogether. On the force of the argument that randomization is the best method of ensuring pre-experimental equivalence of the groups, the psychological reasons of "knowing for sure" are discarded with profit. There may be situations in which pre-testing may be impossible or hazardous.

Quasi-Experimental Designs

There are many natural setting in which the researcher can introduce some aspects of experimental designs into his scheduling of the data collection procedures even though he lacks a full control over the scheduling of experimental stimuli. He has no control over the administration of the treatment (The when and to whom of response and the ability to randomize responses). These reasons/research situations can be regarded as quasi-experimental situations because it is unfeasible the design true
experiments but a causal inference is desired. Sometimes the need for stronger external validity is another reason for the use of quasi-experimental research.

The word 'quasi' means 'almost' or 'as if'. Hence, the term 'quasi-experimental design' indicates that these design look "as if they are experimental", or sometime reach "almost a true experimental setting. These can be regarded as closer to true experimental designs when compared with the pre-experimental ones.

Some of the popular quasi-experimental designs are described as follows:

Non-equivalent Pre-test-Post-test Control Group Design

Group	Pre-test	Treatment	Post-test
A (Non-Random)	O1	X	O2
B (Non-Random)	O3		O4

This design is like the true experimental design using a pre-test post-test central group situation but differs in the formation of groups which is non-random and hence non-equivalent in the present case. This design can be further extended by using more than two groups. Suppose three different method of teaching a foreign language are to be compared

for efficacy, the experimenter can get hold of three intact classrooms and teach each class by using one of the three methods.

Group	Pre-test	Treatment	Post-test
A (Non-Random)	O1	X1	O2
B (Non-Random)	O3	X2	O4
C (Non-Random)	O5	X3	O6

There is no control group. However, each group is used as a control for the other group.

The Separate-sample Pre-test Post-test Design

Group	Pre-test	treatment	post-test
A (Random)	O1	(X)	
B (Random)		X	O2

In this design though the group are formed randomly. Group A is measured before the treatment and group B is measured only after the treatment. (X) indicates presentation of X irrelevant to the research question. Though a weak design it has been used extensively in social science experiments. It is also called "simulated before-and-after design". The design lacks control of 'history'.

An extension of the above design is given as follows:

The Separate Sample Pre-test----- Post-test control Group Design

Group	Pre-test	Treatment	Post-test
A (Random)	O1	(x)	
B (Random)		X	O2

---.

C (Random)	O3	
D (Random)		O4

This design also uses groups as a whole or intact groups. There is random assignment of groups A and B above the dotted lines; similarly below the dotted line. The dotted line shows the non-equivalence of groups above it and those below it.

Time Series Designs

If a group is repeatedly measured before and after the treatment, rather than once before and once after, a different design called Time series Design is created. These designs are especially useful when there are continuous naturally occurring observations of the dependent variable over time and there is a sudden or distinct treatment during the observations. These designs have the advantage of having a series of pre and post-observations to find out the pattern of stability and change more accurately as compared to the pre-test post-test designs. Look at the following time series designs to form an idea of their methodology.

Single-Group Interrupted Time Series Design

Group	Pre-observations	Treatment	Post-Observations
A	O1,O2,O3,O4,O5,O6	X	O7,O8,O9,O10,O11,O12

Control-Group Interrupted Time Series Design

Group	Pre-observations	Treatment	Post-observations
A	O1,O2,O3,O4,O5,O6	X	O7,O8,O9,O10,O11,O12
B	O1,O2,O3,O4,O5,O6	X	O7,O8,O9,O10,O11,O12

In design No.1 there is only one group repeatedly measured six times before and six times after the treatment introduced the time gap between measurement is the same. In design No 2 while the procedure is similar to design No.1, a control group has been added to control for

the “history effects”, and hence a definite improvement over the first one.
These are basis time series designs. There are however, variations of the same. We can have more than two groups and multiple treatments to compare. The experimenter instead of introducing the treatment may withdraw some already occurring phenomenon.
The choice of design will depend on the variables to be studied, the circumstances and setting available, and the claims of the plausible rival hypotheses, and the extent of control the experimenter desires, and can actually muster.

Self assessment

1) The subjects in experimental research are _____.

2) The experimental subjects are in _____ conitions.

3) The experiment is always _____ in terms of results.

4) The experiment is _____.

5) One experimental group is taken and subjected to the manipulation of the _____ variable
(intervention) and see the effects of it on the subects of the _____ group.

ANSWERS
(1) homogeneous (2) controlled (3) quantitative (4) replicable. (5) independent, experimental

5 .6 INTERNAL AND EXTERNAL VALIDITY OF RESULTS IN EXPERIMENTAL RESEARCH

Validity
Validity refers to the degree to which a test measures, what it claims to measure. It is very necessary for a test to be valid for its proper administration and interpretation.
Internal Validity
Internal validity is the most fundamental type of validity because it concerns the logic of the relationships between the independent variable and dependent variable. This type of validity is an estimate of the degree to which inferences about causal relationship can be drawn, based on the measures employed and research design. Properly suited experimental techniques, where the effect of an independent variable upon the dependent one is observed under highly controlled conditions makes possible higher degree of internal validity.

Threats to Internal Validity

These include (i) confounding, (ii) selection bias, (iii) history, (iv) maturation, (v) repeated testing, (vi) instrument change, (vii) regression towards the mean, (viii) mortality , (ix) diffusion, (x) compensatory rivalry, (xi) experimenter bias.

(i) Confounding – confounding error that occurs when the effect of two variables in an experiment cannot be separated, resulting in a confused interpretation of the results.

(ii) Selection bias – Any bias in selecting a group can undermine internal validity. Selection bias indicates the problem that occurs as a result of its existence at the pre-test differences between groups, may interact with the independent variable and thus influence the observed outcome and creates problems.

(iii) History- Events outside the experiment or between repeated measures of dependent variables may influence participants responses, attitudes and behavior during process of experiment, like; natural disasters, political changes etc.

(iv) Maturation- Usually, it happens that subjects change during the course of an experiment or between measurements. Permanent changes (such as physical growth) and temporary changes (like fatigue and illness) may alter the way a subject would react to the independent variable.

(v) Repeated testing- Participants may be driven to bias owing to repeated testing. Participants may remember correct answers or may be conditioned as a result of incessant administration of the test.

(vi) Instrument change – If any instrument is replaced/changed during process of experiment, then it may effect internal validity as alternative explanation easily available.

(vii) Regression towards the mean- During the experiment, if subjects are selected on the basis of extreme scores, then there are chances of occurrence of such an error.

(viii) Mortality- It should be kept in mind that there may be some participants who may have dropped out of the study before its completion. If dropping out of participants leads to relevant bias between groups, alternative explanation is possible that account for the observed differences.

(ix) Diffusion – It might be observed that there will be a lack of differences between experimental and control groups if treatment effects spread from treatment groups to control groups. This, however, does not mean that, independent variable will have no effect or that there would not be a no relationship between dependent and independent variable.

(x) Compensatory rivalry - There will be a change in the behavior of the subject if the control groups alter as a result of the study.

(xi) Experimenter bias : Experimenter bias happens while experimenters, without any intention or reluctance, behave differently to the participants of control and experimental groups, that in turn affects the results of the experiment. Experimental bias can be reduced by keeping the experimenter from knowing the condition in the experiment or its purpose and by standardizing the procedure as much as possible.

External Validity

According to Mc Burney and White (2007), external validity concerns whether results of the research can be generalized to another situation, different subjects, settings, times and so on. External validity lacks from the fact that experiments using human participants often employ

small samples collected from a particular geographic location or with idiosyncratic features. Because of this, it cannot be made sure that the conclusions drawn about cause-effect-relationships are actually applicable to the people in other geographic locations or in the absence of these features.

Threats to External Validity

How one may go wrong in making generalisations, is one of the major threats to external validity. Usually, generalisations are limited when the cause (i.e independent variable) is dependent upon other factors; as a result, all the threats to external validity interact with the independent variable.

a) Aptitude-Treatment-Interaction: The sample might have some features that may interact with the independent variable causing to limit generalizability.

b) Situations : All the situational factors may limit generalisations.

c) Pre- test effects : When the cause-effect relationships can only be found out after the pre-tests are carried out, then, this also tends to limit the generality of the findings.

d) Post-test effects- When cause-effect relationships can only be explored after the post tests are carried out, then this can also be a cause for limiting the generalisations of the findings.

e) Rosenthal Effects – When derivations drawn from the cause- consequence relationships cannot be generalized to other investigators or researchers.

Self Assessment Questions

1) Results cannot be generalized to another situation or population in external validity. (T/F)

2) Dropping out of some subjects before an experiment is completed causing a threat to internal validity. (T/F)

3)Any bias in selecting the groups can enhance the internal validity. (T/F)

4) Internal validity concern the logic of relationship between the independent variable and dependent variable. (T/F)

ANSWERS

(1) False (2) True (3) False (4) True

5.7 VARIABLES IN EXPERIMENTAL RESEARCH

A variable, as the name implies, is something that varies. This is the simplest way of defining a variable.

Webster says that a variable is “a thing that is changeable” or “ a quantity that may have a number of different values. “ A variable is something that has at least two values; however,

it is also important that the values of the variable be observable. Thus, if what is being studied is a variable, it has more than one value and each value can be observed.

Types of variables in experimental research

Independent variable – An independent variable or stimulus variable (as Underwood calls it) is that factor manipulated or selected by the experimenter in his attempt to ascertain its relationship to an observed phenomenon.

Dependent upon the mode of manipulation, some expets have tried to divide the independent variable into 'Type E' Independent Variable and 'Type S' independent variable (D'Amato, 1970). Type E independent variable is one of which is directly or experimentally manipulated by the experimental and type S independent variable is one which is manipulated through the process of selection only. For example the experimenter wants to study the effect of noise upon the task performance in an industry. Here the IV (Independent Variable) is the noise and the DV (Dependent Variable) is the task performance. He may manipulate the noise by dividing into three categories- continuous noise, intermittent noise and no noise and examine its effects in task performance. Here the noise is being directly manipulated by the experimenter and hence, it constitutes the example of Type- E independent variable. Suppose , for the time being, that the experimenter is interested in answering the question: Is the rate of production dependent upon the age of workers? Age is here the independent variable. For investigating this problem, the experimenter wil have to select groups of workers on the basis of their age in a way by which he can get an appropriate representation from different age groups ranging from say, 16 to 55 years. Subsequently, he will compare the rate of production obtained by each age group and finally, conclude whether or not age is a factor in enhancement of the performance. Hence this constitutes the examples of S-independent variables.

Dependent Variable- A dependent variable is the factor that appears, disappears, or varies as the experimenter introduces, removes or varies the independent variable. (Townsend, 1953). The dependent variable is a measure of the behavior of the subject. The dependent variable is a measure of the behavior of the subject. The dependent variable is the response that the person or animal makes. Here the relationship between independent and dependent variables is studied. The relationship is that of dependence. One variable depends upon the other. Suppose the researcher finds a relationship between meaningfulness of the learning material and speed of learning. Speed of learning then depends upon meaningfulness; the greater the meaningfulness, the faster the learning. The speed of learning is, therefore, called dependent variable; meaningfulness is independent variable. Similarly, rest between work periods is independent variables; output of work is dependent variable. In an experiment one discovers and confirms a relationship between an independent variable and a dependent variable.

Confounding variables – is one that varies with the independent variable. While doing a study if we are not careful then two variables may get combined so that the effect of one cannot be separated from the effect of the other. This is known as confounding. For instance, if a study of the effect of the television viewing on perception of violence is studied and the experimental group contained only adolescents, whereas the control group only adults;, the age of participants would be confounded with the independent variable under study. Confounding makes the conclusions of the study doubtful. It is, therefore, necessary that

effort should be made to un-confound the variables.

Univariate variables -'Uni' means 'one', so the data has only one variable (univariate). Univariate data requires to analyze each variable separately. Data is gathered for the purpose of answering a question, or more specifically, a research question. E.g the salaries of workers in a specific industry; the variable in this example is workers salaries.

Univariate data is a term used in statistics to describe data that consists of observations on only one characteristic or attribute. There is only one variable in univariate data. The analysis of univariate data is thus the most basic type of analysis because it deals with only one varable that changes. It is uninterested in causes or relationships, and its primary objective is to explain the data and detect patterns within it.

The main characteristics of univariate data are as follows:

- Univariate data gathers data around a single, random variable. It describes each variable separately.
- Univariate data describes the variable's response pattern.

Bivariate variables – Bivariate is where two variables are observed. One variable here is dependent while the other is independent. For example , the researcher has bivariate data when he/she is studying two variables. These variables are changing and are compared to find the relationships between them. Similarly, if the researcher is studying a group of students to find out their average Math score and their age, there are two variables (Math score and age). So, Bivariate variable is used to compare two sets of data and to discover any relationships between them.

Multivariate variables – Multivariate variables refers to multiple dependent variables that result in one outcome. This means that a majority of our real world problems are multivariate. For example, based on the season, we cannot predict the weather of any given year. Several factors play an important role in predicting the same.

Multivariate analysis encompasses all statistical techniques that are used to analyze more than two variables at once. The aim is to find patterns and correlations between several variables-simultaneously allowing for a much deeper, more complex understanding of a given scenario than with bivariate analysis.

5.7.1 CHECK YOUR PROGRESS 2

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

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. State whether the statement is True or False.

(a) The selection of a problem is the last step of research. ( )

(b) After defining the research problem the hypothesis must be formulated. ( )

(c) Experimental research is used in science subjects ( )

(d) Research problem can be stated in the form of hypothesis. ( )

(e) Experimental design is not generally conducted in the laboratory with complete control

over all variables and all subjects . ( )

2. Define experimental research.

_____

_____

3. Define Research design.

_____

_____

_____

5.8 LET US SUM UP

From the above discussion, we conclude that Research is a scientific methodology in a controlled observation and experiments are the basic tools which gives the status of science to a subject/discipline. It is a systematic attempt to study a phenomenon.

Experimental research is based on highly rigorous procedures and aims at producing highly reliable and valid conclusions. It is a systematic and scientific approach to research in which the researcher deliberately manipulates some aspect of the experiment in which he is interested. He causes certain things to happen, and he observes how the condition is affected and changed. The major steps of experimental research are- surveying the literature relating to the problem, selecting and defining the problem, stating the hypothesis and constructing the experimental plan.

When an experimenter intends to do research, the first thing to do is to decide what research question is to be studied. Having decided about the research question or problem the next thing is to decide how to go about finding their answer. There are various steps through which the researcher pass in the research journey in order to find the answers to research questions. Conceptualising a research design is one of the important steps in planning a research study. The main function of a research design is to explain how to find answers to the research question. For any investigation the selection of an appropriate research design is crucial in enabling the researcher to arrive at valid findings and conclusions. In this lesson we have discussed about various experimental designs.

In experimental research the researcher manipulates one or more variables and controls and measures the other variables. A variable is something that varies. Variables are important in bringing clarity and specificity to the conceptualizing of a research problem, to formulation of hypothesis and to the development of the research instrument. Knowledge of different types of variables play a crucial role in research. There are different kinds of variables such as independent variables, dependent variables, confounding variables etc. In this lesson we have also discussed about concept of univariate, bivariate and multivariate variables. The data which has only one variable is univariate variable. Univariate data requires to analyze each variable separately. Bivariate analysis is one of the statistical analysis where two variables are observed. One variable here is dependent while the other is independent. Multivariate refers to multiple dependent variables that result in one outcome. This means

that a majority of our real world problems are multi-variable.

5.9 KEY WORDS / GLOSSARY

Research Design : the over all plan of frame work that guides the collection and analysis of data to address a research question.

Validity : the extent to which a study accurately measures what it intends to measure, ensuring that conclusions drawn are sound and applicable to the broader population.

Variables : characteristics that can change or take on different values.

Univariate : a statistical method that examines a single variable at a time focusing on describing its characteristics without considerate relationships with other variables.

Bivariate : the data sets that contain two variables, where each piece of information in the data set has two values associated with it.

5.10 Self –Assessment Questions

1. Define the nature of Experimental research.
2. List and describe the steps which the researcher may adopt in conducting the experimental type of research.
3. Define an experimental design.
4. Define validity of the design.
5. Explain internal validity and external validity of the design.
6. List the various types of Time series designs.
7. Write short notes on :

(a) Independent variable (b) Dependent variable.

5.11 SUGGESTED FURTHER READINGS

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QUALITATIVE RESEARCH: CONCEPT AND CHARACTERISTICS

Unit -II **Lesson : 6**

STRUCTURE

6.1 INTRODUCTION

The unit covers fundamental concepts, implications, and applications of qualitative research. It explores different types of qualitative research and compares it with quantitative research. Additionally, the unit highlights the significance of qualitative research and addresses the associated challenges, including ethical considerations.

6.2 LEARNING OBJECTIVES

After the completion of the unit, the learners will be able to;

a) Understand the concept of qualitative research;

b) Describe key elements of the qualitative research;

c) Differentiate different approaches in qualitative research;

d) Critically evaluate the advantages and disadvantages of using qualitative research.

6.3 MEANING OF QUALITATIVE RESEARCH

Researchers use different research methods as research is carried out for various purposes. Two main forms of research, **qualitative and quantitative,** are widely used in different fields. Here we will discuss about **qualitative research** in detail as under:

Qualitative Research

Qualitative research is a scientific method focused on closing the gaps in our knowledge by methodically gathering data, generating results, and aiming to resolve specific queries or issues. It is commonly employed to gather detailed insights into the behaviours, attitudes, values, and various societal dimensions of a distinct group, society, or demographic. In other way we can say that qualitative research is a process used for the systematic collection, analysis, and interpretation of non-numerical data (e.g., text, video, or audio). Qualitative research is the opposite of quantitative research, which involves collecting and analysing numerical data for statistical analysis. Qualitative research is commonly used in the humanities and social sciences, in subjects such as anthropology, sociology, education, health sciences, history, etc. Qualitative research can be used to:

(i) Gain deep contextual understandings of the subjective social reality of individuals.

(ii) To answer questions about experience and meaning from the participant's perspective (Hammarberg et al., 2016).

Examples of qualitative research questions include:

1. How does stress influence young adults' behaviour?

2. What factors influence students' school attendance rates in developed countries?
3. How can mental health lessons be integrated into the school curriculum?

6.4 ORIGIN AND HISTORICAL BACKGROUND OF QUALITATIVE RESEARCH

The origins of qualitative research methods can be traced back to the fields of Anthropology and Sociology, where they were employed as investigative tools in the early 1920s. At that time, a standardized approach had not yet been established, but researchers utilized these methods to delve into cultural practices and social integration in diverse environments. Subsequently, social anthropologists such as Malinowski in 1922 and Mead in 1935, along with sociologists like Park and Burgess in 1925, began to adopt more systematic techniques, which contributed to the evolution of qualitative research. These methods were applied to explore the lives of individuals in various contexts, including urban streets, impoverished areas, and exotic locales.

The 1960s saw the rise of theories and methods such as the symbolic interactionist viewpoint (Becker et al., 1961) and grounded theory (Glaser and Strauss, 1967). Subsequent works, such as an edited volume by Filstead (1970) and books on ethnography by Spradley (1979) helped to shape the qualitative research methodologies that are used today. Giorgi (1985) and Colaizzi (1978) pioneered phenomenological techniques, including phenomenological psychology. Subsequently, the topic gave rise to numerous studies and publications. In 1978, the Journal of Qualitative Sociology was published, and in 1988, the International Journal of Qualitative Studies in Education. However, the term qualitative research was interchangeably used as naturalistic inquiry (Lincoln and Guba, 1985); field research (Burgess, 1984; Delamont, 1992); case study approaches (Stake 1995; Travers, 2001); interpretive/ interpretative research (Bryman, 2001). Irrespective of the terms being used, qualitative research basically focuses on the lived experience, interaction and language of human beings.

6.5 WHY CONDUCT QUALITATIVE RESEARCH?

1. To gain a deeper understanding of how people experience the world.

2. Researchers study individuals in their natural settings, enabling them to

understand phenomena as participants do.

3 Qualitative techniques allow participants to freely disclose their experiences, thoughts, and feelings, providing insights that complement quantitative data.

Key elements related to qualitative research:

6.7 KEY ELEMENTS OF QUALITATIVE RESEARCH

1. **Naturalistic Approach**:

- In qualitative research, investigators study various phenomena in the natural world.
- Data is collected in an uncontrolled setting, allowing for genuine and unfiltered observations.
- Findings are grounded in the natural context rather than predetermined assumptions.

2. **Emergence of New Paths**:

- Qualitative researchers remain flexible and open to change.
- They do not rigidly adhere to preconceived notions but instead explore new avenues of discovery as they emerge.

3. **Purposeful Selection:**

- Researchers purposefully choose individuals, organizations, communities, cultures, events, and critical incidents.
- These selections provide valuable information and serve specific societal purposes.

6.8 CHARACTERISTICS OF QUALITATIVE RESEARCH

Qualitative Research has many characteristics, but some of the broader characteristics has been described below:

1. Emic Perspective (Involvement of Researchers)

The phenomenon under study is centred on the participants' point of view. The result of the qualitative research is the researchers' complete involvement in the natural environments. Participating in the activities is necessary for them to truly understand the processes or events. Prior to beginning the data gathering

procedure, they must familiarise themselves with the environment, culture, and ciprcumstances they will be studying. They must fully engage in the research settings and ensure that their opinions, biases, and preconceptions do not cloud their judgement. Consequently, the researchers use the qualitative research method, which involves their being fully immersed in the cultural surroundings.

2. Formation of Theory through Data

In qualitative research, data is obtained through direct engagement with participants, involving in-depth interactions and interviews. The richly detailed data acquired serves as the cornerstone for theorizing. This approach to research is characterized by its flexible design, which evolves during the research process rather than being fixed from the outset. The insights derived from this method facilitate the examination of current phenomena, the refinement of established theories, or the creation of entirely new theoretical constructs. Therefore, it's evident that data holds a central place in qualitative research.

3. Contextual Research

Qualitative research is inherently tied to the particularities of context, culture, or society, making it acutely sensitive to the nuances of the environment it studies. Researchers immerse themselves in the daily occurrences and events of the subject's life, considering every aspect of the specific circumstances. In doing so, they must set aside their own preconceptions and engage deeply, often participating directly in the events or situations under study. As a result, qualitative research is distinctly defined by its contextuality.

4. Complex and Interwoven Variables:

Factors such as experiences, behaviours, and attitudes are complex and interconnected. They cannot be neatly reduced to isolated variables for quantitative measurement. Qualitative approaches allow participants to describe what, why, or how they were thinking or feeling during the phenomenon being studied**.**

5. Investigator-Research Partnership

Since a qualitative study requires the collection of original replies, the researcher must be impartialandfreeofpreconceptions from the individuals taking part. The interaction between the study participants and the researcher should result in the acquisition of pertinent, bias-free data. Therefore, in order to

get more genuine and honest responses from the participants in a qualitative study, the researcher must fully immerse themselves in the research environment.

6. Rich Explanation

As the data acquired by the participants involves their responses, experiences, interpretations of events, and rituals, Geertz (1973) noted that immersing the researchers in the research context will aid in the use of thick description. The researcher should provide a detailed account of the procedures, phenomena, events, participant interviews, and discussions. Thus, the detailed account comprises factual data, theoretical insights, and analytical insights. In order to aid in the creation of reality and the analysis of research, thick description is used in qualitative research. This description comprises a comprehensive description of the culture, context, procedure, and steps of the study.

7. Data Gathering and Analysis take Place concurrently

In order to gather data, the research scholar dips themselves in the research settings and employs diverse methods such as observation and interviews. Simultaneously, they analyse the findings.

8. Broad Generalization

As was already said, the researchers do not accept the validity of the generalisation process as defined by scientists. They contend that a great deal of important information contained in individual units is compromised during the generalisation process, and as a result, genedized knowledge does not accurately reflect actual knowledge. According to them, the process of creating new knowledge must consider the variations or actual evidence present in various particular circumstances.

9. Ethics

In-depth Researchers reject the idea of value-free research. Value systems are acknowledged to have an impact on problem identification, sample selection, tool use, data collection, settings under which data are collected, and potential interactions between the researcher and respondents.

6.9 Approaches to Qualitative Research

Qualitative research is used to understand how people experience the world. While there are many approaches to qualitative research, they tend to be flexible

and focus on retaining rich meaning when interpreting data. Common approaches include grounded theory, ethnography, phenomenological researchand narrative research. They share some similarities, but emphasize different aims and perspectives.

6.8.1 Phenomenological Study

Researchers investigate a phenomenon or event by describing and interpreting participants' lived experiences. Researchers are claimed to investigate the structures of consciousness in human experiences using a phenomenological method. Experiences here comprise both the external and internal aspects depending on memory image and significance.

Steps of Phenomenological Study

I) In order to properly understand the phenomenon through the perspectives of multiple knowledgeable people, the researcher must first acknowledge his or her own preconceived notions about it.

ii) Secondly, he formulates research questions that delve into the personal significance of the interaction for each person.

iii) Third, the researcher gets information from people who have witnessed the occurrence that is being studied. Typically, in-depth interviews with five to twenty-five highly experienced people are used to collect the data.
iv) Statements and units are used to analyse data. Subsequently, the units are converted into meaning clusters. Ultimately, this kind of analysis is connected to a broad account of experiences that includes both what I experienced and how I experienced it.

6.8.2 Case Study

This approach is used to study a case involving a person, group, occasion, organisation, or society. It aids in giving a thorough understanding of the characteristics, workings, or phenomena of a particular example being studied. Case study research frequently use a variety of data collection techniques, such as questionnaires, documents, observations, interviews, and interviews. The case study's final report offers a comprehensive (i.e., comprehensive and detailed) and rich (i.e., vivid and detailed) overview of the case and its surroundings.

6.8.3 Grounded Theory

With this method, the researcher actively participates in the group, culture, or

community that is being studied. With the aid of observation, the necessary information is gathered in terms of data. It is typically applied when creating or refining hypotheses. This implies that grounded theorists are capable of testing or developing already developed grounded theories in addition to developing new ones.

Features of Grounded Theory

i) Fit: This method aids in determining whether the theory aligns with the actual community that exists.

ii) Understanding: Grounding produces a theory that is understandable and clear.

iii) Generality: The theory offers a wealth of data and room for additional research or the development of new hypotheses.

iv) Control: Because the idea was examined under well-regulated circumstances, it is acceptable.

6.8.4 Narrative research

Researchers examine how stories are told to understand how participants perceive and make sense of their experiences.Unspoken actions, emotions, and motivations can be revealed through narrative research. In-depth language information is also provided, which may help clarify a number of facets of social or cultural things.

Researchers can obtain comprehensive subject knowledge through narrative analysis that is not possible with other techniques. Hidden motivations that are difficult to see immediately are revealed through narrative analysis in qualitative research. This is particularly true when studying participants from different cultural backgrounds, as the researcher has to cut through a culture's layers.

6.9 QUALITATIVE RESEARCH METHODS

Each of the research approaches involve using one or more data collection methods. These are some of the most common qualitative methods:

- **Observations:** recording what you have seen, heard, or encountered in detailed field notes.
- **Interviews:** personally, asking people questions in one-on-one

conversations.

- **Focus groups:** asking questions and generating discussion among a group of people.
- **Surveys:** distributing questionnaires with open-ended questions.
- **Secondary research:** collecting existing data in the form of texts, images, audio or video recordings, etc.

6.10 ETHICAL REFLECTIONS

In qualitative research, it is imperative to adhere to ethical standards. Researchers must honour the dignity and privacy of participants, ensuring that they are fully informed about the study's scope and use of their data. It is the researcher's duty to foster a sense of trust within the community under study. Confidentiality is paramount, and researchers are obligated to safeguard it diligently. They should also be cognizant of the potential risks and benefits of the research, which may encompass psychological and social dimensions. While it is challenging to foresee all ethical quandaries that might emerge during interviews, researchers should be prepared to navigate sensitive topics and avoid conflicts of interest. The principles of anonymity, confidentiality, and informed consent are foundational to the interview process, which, while aimed at gathering information, must also be sensitive to the possibility of rekindling past traumas or revealing confidential information.

6.11 ADVANTAGES OF QUALITATIVE RESEARCH

1. Flexibility: Qualitative research allows for adaptive exploration. Researchers can adjust their data collection and analysis methods as new ideas or patterns emerge. Unlike rigidly predefined procedures, qualitative studies remain open to unexpected insights.

2. Natural Settings: Data collection occurs in real-world contexts or naturalistic environments. Researchers engage with participants where they naturally interact, providing a deeper understanding of their experiences.

3. Meaningful Insights: Qualitative research captures rich descriptions of people's experiences, feelings, and perceptions. These insights can inform the design, testing, or improvement of systems, products, or interventions.

4. Generation of New Ideas: Open-ended responses in qualitative studies allow researchers to uncover novel problems or opportunities. Participants'

narratives often reveal aspects that quantitative measures might miss.

6.12 Disadvantages of Qualitative Research.

While qualitative research provides valuable insights, it also faces certain limitations. Here are the key drawbacks:

- **Unreliability**:
  - The real-world setting introduces **uncontrolled factors**, making qualitative research less reliable.
  - Variables beyond the researcher's control can impact data quality.
- **Subjectivity**:
  - Qualitative research heavily relies on the researcher's interpretation.
  - Since there is no fixed procedure, interpretations can vary significantly.
  - Replication becomes challenging due to this inherent subjectivity.
- **Limited Generalizability**:
  - Qualitative studies often involve **small samples** to explore specific contexts in depth.
  - While rigorous analysis is applied, drawing **generalizable conclusions** remains difficult.
  - The data may not represent the broader population accurately.
- **Labor-Intensive**:
  - Despite software tools for managing text data, **manual analysis** is often necessary.
  - Researchers must carefully review and interpret qualitative data.

Qualitative research is a scientific methodology that facilitates the collection, analysis, and interpretation of data related to a community, market, group, or culture. It aids in recognizing the causes of the actions, encounters, and attitudes of the members of the market, culture, community, or group that is being studied. Because the researcher actively participates in the activities of the

people being studied, it is true in character. It can be conducted without a predetermined framework, purpose, or interest, in contrast to quantitative research. The researcher's main area of interest may shift depending on societal and cultural perceptions. To address the challenges associated with both qualitative and quantitative research, the mix approach method is employed. Despite its many applications, it has certain limitations too.

6.13 LET US SUM UP

Qualitative research is a scientific methodology that facilitates the collection, analysis, and interpretation of data related to a community, market, group, or culture. It aids in recognizing the causes of the actions, encounters, and attitudes of the members of the market, culture, community, or group that is being studied. Because the researcher actively participates in the activities of the people being studied, it is true in character. It can be conducted without a predetermined framework, purpose, or interest, in contrast to quantitative research. The researcher's main area of interest may shift depending on societal and cultural perceptions. To address the challenges associated with both qualitative and quantitative research, the mix approach method is employed. Despite its many applications, it has certain limitations too.

6.14 SELF –ASSESSMENT QUESTIONS

Q1. Discuss the characteristics and key elements of qualitative research

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Q2. Compare and contrast the qualitative research method and quantitative research.

Q3. Give one example of each of the following:

i) Phenomenological study ----------

ii) Ethnography ----------

iii) Case study----------

iv) Grounded theory approach----------

6.15 SUGGESTED RAEDINGS

1. Delamont, S. (2004). Ethnography and participant observation. *Qualitative research practice*, *217*(205-217).

2. Filstead, W. J. (1970). Qualitative methodology: Firsthand involvement with the social world. *(No Title)*.

3. Giorgi, A. (1985). Phenomenology and psychological research. Pittsburgh, PA: Duquesne University Press.

4. Hammarberg, K., Kirkman, M., & De Lacey, S. (2016). Qualitative research methods: when to use them and how to judge them. *Human reproduction*, *31*(3), 498-501.

5. Heath, H., & Cowley, S. (2004). Developing a grounded theory approach: a comparison of Glaser and Strauss. *International journal of nursing studies*, *41*(2), 141-150.

6. Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. sage.

7. Malinowski, B. (1922). Ethnology and the Study of Society. *Economica*, (6), 208-219.

8. Spradley, J. P. (1979). Ethnography and culture. *The ethnographic interview*, 3-16.

9. Walters, S. (2007). 'Case study' or 'ethnography'? Defining terms, making choices and defending the worth of a case. In *Methodological developments in ethnography* (pp. 89-108). Emerald Group Publishing Limited.

TYPES OF QUALITATIVE RESEARCH: PHENOMENOLOGICAL RESEARCH, ETHNOGRAPHIC RESEARCH, CASE STUDIES,

GROUNDED RESEARCH, PHILOSOPHICAL RESEARCH

Unit -II **Lesson :7**

Structure

7.1 INTRODUCTION

The unit deals with the meaning and types of Qualitative Research The unit also tries to introduce and describe various types of the qualitative research like Phenomenological Research, Ethnographical Research, Case Studies, Philosophical Studies, Grounded Theory.

7.2 LEARNING OBJECTIVES

After the completion of the unit, the learners will be able to;

a) Explain the meaning of the qualitative research

b) Understand the types of qualitative research

c) Understand the methodology and application of qualitative methods- Phenomenological Research, Ethnographical Research, Case Studies, Grounded Research, Philosophical Research

7.3 QUALITATIVE RESEARCH – MEANING

Qualitative research is a scientific approach aimed at filling gaps in knowledge by gathering evidence, analyzing findings, and addressing questions or issues. In general terms, scientific research consists of an investigation that:

- ✓ seeks answers to a question
- ✓ systematically uses a predefined set of procedures to answer the question
- ✓ collects evidence
- ✓ produces findings that were not determined in advance
- ✓ produces findings that are applicable beyond the immediate boundaries of the study.

Qualitative research shares all these characteristics which are described above. Additionally, it seeks to understand a given research problem or topic from the perspectives of the local population it involves. Qualitative research is especially effective in obtaining culturally specific information about the values, opinions, behaviors, and social contexts of particular populations. For instance, examining the spiritual growth of college students is an example of qualitative research.

7.4 TYPES OF QUALITATIVE RESEARCH

Qualitative research is a methodological approach used to explore and understand phenomena in depth, often focusing on meanings, experiences, and perspectives. Here are some common types of qualitative research:

1. **Ethnographical Research:** This involves immersing the researcher in a particular culture or social setting to understand the beliefs, behaviors, and practices of the people involved. It often includes participant observation, interviews, and analysis of artifacts.
2. **Phenomenological Research:** This approach seeks to understand and describe the lived experiences of individuals regarding a particular phenomenon. It involves in-depth interviews and analysis to uncover the

essence of these experiences.

3. **Grounded Theory:** In grounded theory, researchers develop theories or concepts grounded in the data collected. It involves systematic data collection and analysis to generate new theoretical insights or frameworks.
4. **Case Studies:** Case studies focus on in-depth exploration of a single case or a small number of cases. They are often used to gain insights into complex phenomena or to explore unique situations in detail.
5. **Discourse Analysis:** Discourse analysis examines language use and communication patterns to understand how meaning is constructed and negotiated in social contexts. It explores power dynamics, ideologies, and social structures through language analysis.
6. **Historical Research:** This type of qualitative research examines past events, practices, and phenomena to understand their significance and implications. It involves analyzing historical documents, artifacts, and narratives.

Each type of qualitative research offers unique strengths and can be applied depending on the research question, objectives, and context of the study.

7.4.1 PHENOMENOLOGICAL RESEARCH

7.4.1.1 Introduction

The phenomenological approach aims to uncover specific phenomena by exploring how they are perceived by individuals involved in a situation. This typically involves using qualitative methods like interviews, discussions, and participant observation to gather detailed information and perspectives, which are then presented from the viewpoint of the research participants. Phenomenology focuses on studying experiences from an individual's perspective, setting aside preconceived notions and habitual ways of seeing things. It is rooted in personal knowledge and subjectivity, highlighting the significance of personal viewpoints and interpretations. This approach is valuable for understanding subjective experiences, gaining insights into people's motivations and behaviors, and challenging established assumptions and common beliefs.

But, as Schwandt (2006, p. 99) has cogently pointed out, A phenomenological description is not just an idiosyncratic perspective of an experience or

subjective opinion of a meaning. The researcher seeks to convey a meaning that is fundamental to the experience no matter which specific individual had the experience. As Polkinghorne (1989) suggests, the reader of a phenomenological study should come away with the feeling, “I understand better what it is like to experience that”.

7.4.1.2 Key Principles of Phenomenological Research

Following are some key principles of the phenomenological research:

a) **Epoche:** Researchers must temporarily set aside their preconceptions and assumptions about a phenomenon to explore it objectively from the perspective of the participants.

b) **Subjective Experience:** Phenomenological research focuses on understanding subjective experiences and meanings as they are lived and perceived by individuals.

c) **Qualitative Methods:** Phenomenology typically employs qualitative methods such as interviews, participant observation, and in-depth discussions to gather rich, detailed data about participants' experiences.

d) **Intentionality:** Phenomenology emphasizes the intentional nature of human consciousness, where individuals actively engage with and interpret their experiences.

e) **Phenomenological Reduction:** Researchers engage in a process of reduction or abstraction to uncover the essential structures and meanings underlying participants' experiences.

f) **Rich Description:** Phenomenological studies aim to provide a rich description of the phenomenon under investigation, capturing the nuances and complexities of participants' experiences.

g) **Holistic Approach:** Phenomenological research often takes a holistic approach, considering the context, environment, and personal history of participants in understanding their experiences.

h) **Interpretative Analysis:** Researchers engage in interpretative analysis to uncover patterns, themes, and meanings within participants' accounts, aiming to derive deeper insights and understanding.

i) **Emphasis on Context:** Phenomenology acknowledges the importance of context in shaping individuals' experiences, behaviors, and

perceptions, and seeks to explore these contextual influences.

7.4.1.3 Steps in conducting Phenomenological Research

Phenomenological research involves several systematic steps:

- ✓ **Research Question Formation**: Typically open-ended, aiming to understand the essence of an experience.
- ✓ **Participant Selection**: Participants are chosen based on their experience with the phenomenon under study. Often, small, purposive samples are used.
- ✓ **Data Collection:** Common methods include in-depth interviews, diaries, and observations, focusing on participants' descriptions of their experiences.
- ✓ **Epoché/Bracketing**: Researchers intentionally set aside their biases and preconceptions.
- ✓ **Phenomenological Reduction**: Breaking down experiences to their core components to understand the essence of the phenomenon.
- ✓ **Data Analysis:** Involves transcribing interviews, coding significant statements, identifying themes, and synthesizing these to describe the essence of the phenomenon.

7.4.1.4 Types of Phenomenology

a) **Descriptive Phenomenology (Husserlian):** Focuses on describing the essence of an experience. Researchers aim to describe phenomena as directly experienced by individuals without adding interpretation.

b) **Interpretive Phenomenology (Hermeneutic):** Emphasizes the interpretation of experiences. Researchers seek to understand the meaning of experiences within the context of participants' lives and cultures.

7.4.1.5 Applications of Phenomenological Research

Phenomenological research has several applications in the social sciences due to its focus on understanding human experiences and meanings. Here are some elaborations on its applications in various social science fields:

1. **Psychology:** Phenomenology is used in psychology to explore subjective experiences, perceptions, emotions, and motivations. It can

be applied in studying phenomena such as trauma, mental health disorders, identity formation, and the lived experiences of marginalized groups.

2. **Sociology:** In sociology, phenomenological research is valuable for examining social interactions, roles, norms, and cultural meanings. It can be applied to study topics like social inequality, identity politics, group dynamics, social change, and the construction of social reality.
3. **Anthropology:** Phenomenology is useful in anthropology for understanding cultural practices, beliefs, rituals, and symbolic meanings within different societies. It can be applied to study cultural diversity, ethno-religious identities, kinship systems, and the impact of globalization on local cultures.
4. **Education:** In education, phenomenological research helps in understanding students' learning experiences, perspectives on teaching methods, educational environments, and factors influencing academic success. It can be applied to improve teaching practices, curriculum development, and educational policies.
5. **Social Work:** In social work, phenomenology is applied to understand clients' perspectives, needs, strengths, and challenges. It can inform interventions, counseling approaches, advocacy efforts, and social policies aimed at promoting well-being and social justice.
6. **Political Science:** Phenomenological research can be applied in political science to explore individuals' political beliefs, ideologies, participation in political processes, and perceptions of power and governance. It can inform studies on political behavior, public opinion, policymaking, and democratic practices.
7. **Communication Studies:** Phenomenology is used in communication studies to examine how individuals interpret and make sense of media messages, interpersonal interactions, and cultural symbols. It can be applied to analyze communication patterns, media effects, persuasion strategies, and intercultural communication dynamics.

7.4.1.6 Strengths & Constraints of Phenomenology Research

Strengths

- Provides deep insights into individuals' lived experiences.

- Captures the richness and complexity of human experience.
- Can reveal hidden meanings and essences of phenomena.

Limitations

- Requires rigorous and reflective bracketing, which can be difficult to achieve.
- Interpretation can be subjective, leading to potential biases.
- Time-consuming and requires intensive engagement with data.

7.4.1.7 Conclusion

Phenomenology in qualitative research is a robust methodological approach aimed at exploring and describing human experiences to uncover their essence. It involves meticulous data collection and analysis to understand participants' lived experiences while setting aside researcher biases. This methodology has profound applications across various disciplines and provides valuable insights into the intricate nature of human existence.

7.4.2 ETHNOGRAPHIC RESEARCH

7.4.2.1 Introduction

Ethnography is an examination of people and cultures, aiming to delve into cultural aspects by adopting the perspective of the subjects under study. It involves creating graphical and written representations of a group's culture. This qualitative research approach involves researchers observing or engaging with participants in their natural settings. While ethnography originated in anthropology, it has become prevalent in various social sciences. Skilled researchers are essential for observing or interacting with target groups in their real-world contexts. Ethnographic studies typically utilize techniques like interviews, participant observation, and surveys.

7.4.2.2 Key Features of Ethnographic Studies

Various features of the Ethnographic studies are as enlisted below:

- ✓ Usually focus on very few cases, maybe just one, but in detail
- ✓ Often involve working with previously unstudied phenomenon
- ✓ Emphasise on exploring social phenomena rather than testing of preset hypotheses
- ✓ Focus on describing the culture of a group in very detailed and complex

manner

- ✓ Involve engaging in extensive fieldwork where data collection is mainly by interviews, symbols, artifacts, observations, and many other sources of data
- ✓ Field-based and is conducted in the settings in which real people actually live, rather than in laboratories where the researcher controls the elements of the behaviors to be observed or measured.
- ✓ A holistic approach to the study of cultural systems
- ✓ A process of discovery, making inferences, and continuing inquiries in an attempt to achieve maximum validity
- ✓ An open-ended emergent learning process, and is highly flexible and creative process
- ✓ Interpretive, reflexive, and constructivist process
- ✓ Requires the daily and continuous recording of field notes
- ✓ Tries to earn trust of the respondents

7.4.2.3 Methodological Approach in Ethnographic Research

Ethnographic studies typically involve several key steps, including:

1. **Research Design:** Define the research objectives, questions, and scope of the study. Determine the population or group to be studied and select appropriate research methods.
2. **Entry and Access:** Gain entry into the community or group being studied and establish rapport and trust with participants. Obtain informed consent and ensure ethical considerations are addressed.
3. **Participant Observation:** Engage in immersive participant observation by spending time with participants in their natural environments. Observe behaviors, interactions, cultural practices, and daily routines.
4. **Field Notes:** Take detailed field notes during observations, documenting observations, interactions, conversations, nonverbal cues, and contextual information. Include your own reflections and interpretations.
5. **Interviews:** Conduct semi-structured or unstructured interviews with

key informants or participants to gather in-depth insights into their experiences, perspectives, beliefs, and cultural norms. Use open-ended questions to encourage detailed responses.

6. **Document and Artifact Analysis:** Collect and analyze documents, artifacts, and materials relevant to the study, such as historical records, cultural artifacts, media representations, and written texts. Analyze these sources for insights into the cultural context and practices.
7. **Data Analysis:** Organize and analyze the collected data, including field notes, interviews, and document analysis. Use qualitative analysis techniques such as thematic analysis, coding, and pattern recognition to identify themes, patterns, and relationships within the data.
8. **Triangulation:** Validate findings and enhance the credibility of the study by triangulating data from multiple sources, such as observations, interviews, and document analysis. Compare and contrast different perspectives to gain a comprehensive understanding of the phenomenon.
9. **Interpretation:** Interpret the findings within the cultural and social context, considering historical, political, economic, and environmental factors. Generate insights, explanations, and theories based on the data analysis.
10. **Reporting and Writing:** Write up the ethnographic study, including an introduction, methodology, findings, analysis, discussion, and conclusions. Present findings in a clear, coherent, and engaging manner, using quotes, anecdotes, and illustrations to support key points.
11. **Ethical Considerations:** Ensure ethical considerations throughout the study, including confidentiality, informed consent, respect for cultural norms, and responsible dissemination of findings. Address any ethical issues that may arise during the research process.

7.4.2.4 When do we use Ethnography?

Ethnography is primarily used in the following instances:

- ✓ While searching for the meanings of cultural norms and views
- ✓ In trying to understand the reasons for the use of certain behavior or practices

- ✓ For examining social trends and instances like divorce, illness, migration
- ✓ For examining social interactions and encounters
- ✓ To understand the roles of families and organizations and their behaviour
- ✓ To identify new patterns and gain new insights into social phenomenon
- ✓ To understand the hygiene and sanitation practices of communities
- ✓ To observe the types of punishment given to children at school
- ✓ To study the behaviour of workers in an organization

7.4.2.5 Advantages & Constraints of Ethnographic Research

Advantages of Ethnographic Research

1. **Complexity of Group Behaviors:** Ethnographies can account for the complexity of group behaviors, revealing interrelationships among various dimensions of group interactions and providing context for behaviors.
2. **Qualities of Group Experience:** Ethnographies can uncover qualities of group experience that other research methods might overlook, allowing researchers to understand why behaviors occur rather than just noting their occurrence.
3. **Future Research:** Ethnographic studies can help in determining future research questions and types of follow-up studies, expanding knowledge and understanding of the studied phenomenon.
4. **Contextual Understanding:** They provide a deep contextual understanding of behaviors, interactions, and cultural dynamics, offering insights that quantitative studies may not capture.

Constraints in Using Ethnographic Research:

1. **Time-Consuming:** Ethnographic research is time-consuming and requires a well-trained researcher. Building trust with informants and facilitating honest discourse takes time, making short-term studies challenging.
2. **Researcher Bias:** Bias on the part of the researcher can influence the

study's design, data collection, and interpretation, potentially leading to skewed results or false assumptions.

3. **Data Management:** Managing data in ethnographic research can be challenging. Too little data may lead to incomplete insights, while excessive data may be difficult to process effectively.
4. **Resource Intensive:** Ethnographic studies can be resource-intensive in terms of time, personnel, and financial resources, making them less feasible for some research projects.

7.4.3 CASE STUDY

7.4.3.1 Introduction

A case study in qualitative research is a research method that involves an in-depth, detailed examination of a single instance or event (a case) to explore and understand complex issues within their real-life context. It is a research approach that focuses on understanding the dynamics present within single settings. The characteristics of case study are:

- It can involve a single subject, a small group of subjects, or an environment.
- It is often used in social sciences, business, and education to explore and analyze complex issues.

7.4.3.2 Purpose of Case Study

- To gain a deep understanding of the subject matter.
- To generate insights that might not be achievable by other methods.
- To develop hypotheses and theories.
- To uncover new variables or phenomena.
- To provide detailed narratives and rich descriptions for the context of study.

7.4.3.3 Types of Case Studies

According to Merriam (1998), the case study method used in qualitative research has the following characteristics: Particularistic, Descriptive & Heuristic.

1. **Particularistic:** These case studies focus on a specific individual,

group, event, program, or phenomenon. They may shed light on broader issues but can also be influenced by the researcher's biases.

2. **Descriptive:** Descriptive case studies delve into the complexities of a situation, highlighting multiple contributing factors rather than a single cause. They examine how people's opinions and the passage of time influence the phenomenon. Data for descriptive case studies are gathered from various sources such as interviews and observations.
3. **Heuristic** – A case can explain the reasons for a problem or issue (i.e. what happened and why). For example, through a case study it is possible to explain a curriculum innovation failed to work.

7.4.3.4 Methodology used in conducting case studies

1. Selection of cases.

- Purposeful sampling is often used.
- Cases are chosen based on their ability to provide relevant insights.
- Consideration of uniqueness, relevance, and accessibility.

2 Data Collection:

Utilizes multiple data sources to get a comprehensive view. Common methods include:

- Interviews: In-depth, semi-structured or unstructured interviews.
- Observations: Participant or non-participant observations.
- Documents and Archival Records: Use of letters, emails, reports, etc.
- Artifacts: Physical objects related to the case.

Triangulation of data sources to ensure reliability and validity.

3. Data Analysis

Involves organizing and interpreting qualitative data.

- Techniques include coding, thematic analysis, and pattern matching.
- Narrative structuring to form a cohesive story.
- Constant comparison to refine and cross-check findings.

7.4.3.5 Strengths of Case Study

- **Depth and Detail:** Provides a comprehensive and holistic view of the

case.

- **Contextual Understanding:** Captures the complexities and nuances within their real-life context.
- **Flexibility**: Allows for adaptive methods as the study progresses.
- **Rich Data:** Generates detailed, qualitative data that can reveal new insights and understandings.
- **Practicality:** Provides practical, real-world relevance and solutions to specific problems.

7.4.3.6 Limitations of Case Studies

- **Generalizability**: Findings may not be generalizable to a wider population.
- **Subjectivity:** Potential for researcher bias, which can affect the interpretation of data.
- **Time-consuming**: Requires significant time and resources to collect and analyze detailed data.
- **Complexity**: Difficult to manage and analyze large volumes of qualitative data.

7.4.3.7 Ethical Considerations

- ✓ **Informed Consent**: Ensuring participants are fully aware of the study's aims and consenting to their involvement.
- ✓ **Confidentiality**: Safeguarding the privacy and confidentiality of participants.
- ✓ **Non-maleficence:** Ensuring no harm comes to the participants or community.
- ✓ **Reflexivity:** Researchers must reflect on their own biases and influence on the research process.

7.4.4 GROUNDED THEORY RESEARCH

7.4.4.1 Introduction

Grounded theory is a fundamental and widely used approach in qualitative research, focusing on generating theory based on data collected from various

sources. It stands out as the only qualitative method that can incorporate quantitative data if necessary. This approach involves collecting and interpreting textual data, such as field notes or video recordings, and then categorizing the data into variables. These variables are then analyzed to understand their interrelationships.

Creating variables requires a deep understanding of the literature and selecting appropriate techniques. The ability to analyze and interpret variables is termed "theoretical sensitivity," which researchers must enhance. Grounded theory was developed by Glaser and Strauss in the 1960s and emphasizes goals, perspectives, methods, and stages for theory formulation.

7.4.4.2 Background of Grounded theory

Grounded theory is a qualitative research methodology that was developed in the 1960s by sociologists **Barney Glaser** and **Anselm Strauss**. It emerged from their work on dying hospital patients and was detailed in their 1965 book “Awareness of Dying” and further elaborated in their 1967 book "The Discovery of Grounded Theory".

The methodology is distinctive for its systematic generation of theory from data, which is collected and analyzed simultaneously. This approach involves the construction of hypotheses and theories through the collection and analysis of data, rather than starting with a hypothesis as in traditional research.

7.4.4.3 Significance of Grounded Theory

The significance of the data collected and the theory generated through grounded theory lies in several aspects:

i) Grounded theorists compile reports based on information gathered from various sources, increasing the reliability and validity of the theory.

ii) The grounded theory approach allows for exploring facts and analyzing the underlying causal reasons for those facts.

iii) It is an inductive research method grounded on observations and collected data.

iv) Grounded theory provides a framework for specifying how a knowledge base should evolve or change based on new information.

v) Categorized data from grounded theory forms a basis for organizing and presenting research results effectively.

7.4.4.4 Types of Grounded theory

- **Classic Grounded Theory**: This is the original form developed by Glaser and Strauss. It emphasizes the discovery of theory from data that is systematically obtained and analyzed. The focus is on generating a theory that explains the phenomenon being studied, without being influenced by preconceived notions or existing theories. The process involves a continuous cycle of data collection, coding, and analysis, aiming to develop categories and subcategories grounded in the data. These are then compared and synthesized to generate a theory that explains the phenomenon.
- **Constructivist Grounded Theory**: Developed by Kathy Charmaz, this approach emphasizes the role of the researcher in the process of theory development. It acknowledges that the researcher's perspectives and interactions with the data play a significant role in the construction of the theory. This type of grounded theory is more interpretive and acknowledges the subjectivity of the research process.

7.4.4.5 Steps involved in Grounded Theory Development

Dear Learners, as you are aware that Grounded Theory is a qualitative research methodology that involves systematically generating and analyzing theories based on empirical data. The steps typically followed in Grounded Theory include:

1. Memoing: The initial step for the researcher is to gather data in the form of memos, which are concise notes. These memos serve as a data source for further analysis and interpretation. Memos can be categorized into three types:

a) Theoretical notes: These notes detail how textual data aligns with existing literature in the study area, typically spanning one to five pages. Multiple theoretical notes are integrated into the final theory and report.

b) Field notes: These notes capture observations made while actively engaging with the studied population, culture, or community. They document behaviors, interactions, events, and causal factors.

c) Code notes: Researchers categorize things, properties, and events with labeling or naming, creating code notes that discuss these labels. Code notes guide the analysis process and contribute to the final reports.

2. **Open Coding**: Begin with open coding, where you analyze the data line by line to identify concepts, categories, and patterns. This involves breaking down the data into discrete parts and labeling them with descriptive codes.

3. **Axial Coding**: Once you have a set of initial codes, conduct axial coding to explore relationships between codes and categories. This involves categorizing data based on relationships and connections, creating subcategories, and identifying core concepts.

4. **Selective Coding**: Focus on core categories or themes that emerge from axial coding. Develop a central theoretical framework by integrating these core categories and their relationships. This step involves refining and consolidating the theory based on the most significant and recurring themes in the data.

5. **Memoing**: Throughout the process, write memos to capture your thoughts, ideas, and insights about the data, codes, categories, and emerging theory. Memos help in documenting the thought process and maintaining a record of analytical decisions.

6. **Theoretical Sampling**: As the theory develops, engage in theoretical sampling, which involves purposefully selecting new data sources or participants to further develop and refine the emerging theory. This iterative process helps in testing and validating the theory.

7. **Constant Comparison**: Continuously compare new data, codes, and categories with existing ones to ensure consistency and coherence in the emerging theory. This involves revisiting and revising codes and categories based on new insights from the data.

8. **Saturation**: Work towards theoretical saturation, where new data no longer leads to significant changes or additions to the theory. This indicates that the theory has reached a point of completeness and depth based on the available data.

9. **Writing up the Theory**: Finally, write up the grounded theory, including a clear description of the research process, data collection methods, coding procedures, key findings, theoretical framework, and implications of the theory for the research field.

These steps in Grounded Theory emphasize a systematic and iterative approach to theory development based on empirical data, allowing researchers to

generate rich, contextually grounded theories from qualitative data.

7.4.4.6 Advantages of Grounded Theory Research

- ✓ **Emergent Design:** Grounded theory allows for the development of a theory or framework that emerges directly from the data, rather than being predetermined before data collection. This leads to novel and contextually relevant insights.
- ✓ **Flexibility:** Grounded theory research is flexible and iterative, allowing researchers to continuously refine and adjust their theories based on new data and insights, leading to a deeper understanding of the phenomenon under study.
- ✓ **Holistic Understanding:** It provides a holistic understanding of complex phenomena by exploring multiple perspectives, contexts, and contributing factors, leading to comprehensive and nuanced findings.
- ✓ **Conceptual Depth:** Grounded theory encourages researchers to delve deeply into the underlying concepts, patterns, and relationships within the data, leading to rich and detailed conceptualizations of the phenomenon.
- ✓ **Practical Applicability:** The theories and frameworks developed through grounded theory research are often practical and applicable to real-world settings, providing insights that can inform interventions, strategies, or policy decisions.
- ✓ **Participant-Centric:** Grounded theory research prioritizes the perspectives and experiences of participants, leading to theories that are grounded in the lived realities of those being studied.
- ✓ **Innovative Insights:** It fosters creativity and innovation in research by allowing researchers to explore unexpected findings, contradictions, or new avenues of inquiry that may arise during the data analysis process.
- ✓ **Credibility and Trustworthiness:** Grounded theory research emphasizes rigor and transparency in data collection, analysis, and interpretation, enhancing the credibility and trustworthiness of the findings and resulting theories.
- ✓ **Interdisciplinary Potential:** Grounded theory research can be applied across various disciplines and fields, making it a versatile and valuable

approach for exploring diverse research questions and topics.

- ✓ **Contributions to Knowledge:** Grounded theory research contributes to the advancement of knowledge by generating new theories, frameworks, or conceptual models that can be further tested, validated, or refined through future research.

7.4.5 PHILOSOPHICAL RESEARCH

7.4.5.1 Introduction

Philosophical research delves into what ought to be, focusing on normative aspects. C. Sheshadri defines philosophical research by its rigorous critical analysis, exploration of fundamental assumptions, clarification of concepts, synthesis of perspectives, and justification of normative propositions and recommendations. He emphasizes the importance of semantic precision, coherence of thought, awareness of assumptions, and methodological consciousness in philosophical research. This type of research is qualitative in nature, aiming for depth and clarity in understanding normative principles and ideas.

7.4.5.2 Key features of philosophical research

Key features of philosophical research include:

1. **Normative Nature:** Philosophical research is normative, focusing on what should be or what is ideal rather than descriptive or predictive.
2. **Critical Analysis:** It involves rigorous critical analysis of assumptions, concepts, ideologies, and beliefs.
3. **Concept Clarification:** Philosophical research aims to clarify concepts, theories, and ideas, often through reflective and contemplative processes.
4. **Synthesis of Views:** It involves synthesizing various perspectives, theories, and arguments to develop comprehensive understandings.
5. **Justification of Normative Assumptions:** Philosophical research justifies normative assumptions and prescriptions through logical reasoning and argumentation.
6. **Semantic Clarity:** It emphasizes semantic clarity and meaningfulness in articulating ideas and arguments.

7. **Rigorous Thought:** It requires consistency and rigor of thought, with awareness of underlying assumptions and methodological considerations.
8. **Methodological Awareness:** Philosophical research involves awareness of different philosophical methodologies and approaches to inquiry.
9. **Reflective Inquiry:** It encourages reflective inquiry, critical thinking, and contemplation to deepen understanding and resolve conceptual complexities.
10. **Dialectical Exchange:** Philosophical research often involves dialectical exchanges, where arguments, counterarguments, and revisions of views contribute to intellectual discourse and progress.

7.4.5.3 Significance of philosophical research

The significance of philosophical research is evident in:

1. **Critical Analysis:** It fosters critical thinking and analysis of fundamental questions and beliefs.
2. **Normative Guidance:** Provides ethical and moral insights, guiding decision-making.
3. **Conceptual Clarity:** Enhances understanding by clarifying complex concepts and theories.
4. **Intellectual Development:** Stimulates intellectual growth and creativity.
5. **Interdisciplinary Dialogue:** Facilitates interdisciplinary discussions and collaborations.
6. **Ethical Reflection:** Promotes ethical awareness and responsible decision-making.
7. **Cultural Understanding:** Deepens understanding of cultural and historical contexts.
8. **Knowledge Advancement:** Contributes new ideas and perspectives, advancing knowledge.
9. **Personal Growth:** Develops critical thinking skills and fosters lifelong learning.

10. **Social Impact:** Influences societal debates, advocacy, and policy discussions.

7.4.5.4 Steps of Philosophical Research

Vashishtha, U. C., suggested these steps to be following commonly in philosophical research:

1. **Identification of research problem:** The process of philosophical research study starts with the identification of appropriate theme for study.

   Some popular areas of philosophical research in education are:

   Educational philosophy of any personality.

   Educational implications of any philosophy.

   Comparison of one philosophy with the other.

   Finding a philosophy in a particular system.

   Analytic study of a particular philosophy/ idea or thinker.

   Critical analysis of philosophical system/practice or act.

   Understanding philosophy and philosophical issues of a subject.

   Building/synthesizing a concept or philosophy.

2. **Review of related literature** Keeping in view the identified theme and the preliminary questions raised therein, the researcher collect all possible data relevant to the theme from the available literature. The sources may be of literary nature, such as write-ups or opinions of the, philosophers concerned and commentaries on the relevant philosophical works appearing in the forms of books, journals, transcriptions, recordings, research reports, etc.

3. **Reading and discussion**: Thoroughly reading the chosen literature enables researchers to understand the ideologies and formulate their own perspectives. Engaging in discussions and revisiting topics with experts and peers in the relevant field is the next step to address any gaps in understanding and clarify concepts.

4. **Thinking and contemplating:** Philosophical researches need comprehensive and critical thinking and contemplating. A deep speculative thinking on the collected data enables the researcher to find connection and differences between various ideas. Further contemplation clears the doubts and corrects the existing knowledge.

5. **Jotting down, systematizing and presenting:** In the subsequent stage, the data is analyzed with the primary questions in mind within a specific context. This analysis may involve various methods such as summarizing, describing, comparing, appraising, and cross-examining different ideas or concepts related to the main questions. It's important to note that our subjective perspectives may influence this interpretation process. While researchers inherently view others' ideas from their own standpoint, it's crucial to consciously strive for objectivity and interpret these ideas without letting personal biases affect the analysis.
6. **Reporting of the study:** The final phase of the philosophical research is typically associated with presenting the research findings. This involves structuring the report in a logical manner, ensuring a cohesive flow between different sections, and drawing appropriate conclusions by the end. It's crucial to prioritize clarity and precision in the presentation at this stage. Additionally, the report should include relevant references, quotes, and emphasize key points thoughtfully to enhance the overall quality of the presentation.

7.5 LET US SUM UP

Dear learners, in this unit, we explored the essence and various methodologies of qualitative research. Qualitative research aims to deeply understand human experiences and behaviors. The Key types of this research includes phenomenological research, which delves into lived experiences; ethnographical research, which studies cultures through immersive observation; and case studies, which provide detailed analysis of specific instances. Grounded theory generates theories from empirical data, while philosophical research examines fundamental questions about reality and ethics. Each methodology offers unique insights, enriching our understanding of complex social phenomena and human interactions.

7.6 SELF –ASSESSMENT QUESTIONS

1. In what ways does phenomenological research help in understanding human motivations, behaviors, and actions? Give examples of possible research questions.

_____

_____

2. Describe the process of data analysis in ethnographic research, including techniques like coding, thematic analysis, and triangulation.

3. Enlist the challenges researchers might face while conducting this case studies?

4. What is the purpose of memoing in grounded theory research, and what are the three types of memos commonly used?

5. What is the primary focus of philosophical research?

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Qualitative Data : Descriptive, Personal documents, Official documents, field notes and photographs.
Difference between Quantitative Research and Qualitative Research

Unit -II **Lesson: 8**

STRUCTURE

8.1 INTRODUCTION

As you are aware, researcher employs a variety of research techniques depending on the objectives of his study. In order to conduct Qualitative research, researcher needs to be familiar with types of data used in Qualitative research. He must be acquainted with the strengths and limitations of each type. So, here we will discuss about the types of qualitative data.

The Data that cannot be counted, quantified, or expressed in numerical form is referred to as qualitative data. Typically, text, audio, and image data are used to collect this type of data. Word clouds, concept maps, graph databases, and other data visualization tools can be used to share it. Qualitative data are non-numerical data that are used to describe and capture characteristics, meanings, attributes, concepts, and other aspects of things that are not measurable. It is

only defined in words or labels to describe features or traits. This data type is used to know the trends and meanings of natural actions. Qualitative data is also known as categorical data. It is set based on facts and features of a thing or situation. We can divide the qualitative data into two types Nominal data and ordinal data.

- **Nominal Data:** These are variables that are not quantified and have no measurable value. With nominal data, mathematical functions cannot be satisfied. Without quantifying the data, we use it for naming and labeling purposes. Pie charts or bar charts are used to define nominal data. It may appear in pictures, audio, videos, or written records. It is gathered by means of observation.

  Examples: Contact number, gender, and race are a few examples of nominal data.

- **Ordinal Data**: Ordinal data is a qualitative data type that can be arranged in an ordered fashion, but it lacks a clear separation between variables or categories. The Likert scale is a type of ordinal data that is used to sort replies; however, the difference between.

Example: taste of food, good or bad.

8.2 LEARNING OBJECTIVES

After reading this unit, learners will be able to:

1. Describe the concept of Qualitative Research and its characteristics.
2. Describe the types of Qualitative research
    - Phenomenological research
    - Ethnographic research
    - Case studies
    - Philosophical research
    - Grounded research
3. Describe the tools of data collection in Qualitative Research
    - Personal Documents
    - Official Documents

- Field notes
- Photographs

4. Differentiate between Qualitative Research and Quantitative research

8.3 DESCRIPTIVE DATA

As you know, the goal of qualitative descriptive research is to present a thorough account of what happened. Qualitative descriptive studies describe a phenomenon. The purpose of this study design is to provide answers to the who, what, where, and how questions using a journalistic approach.A qualitative research study is significant and suitable design, when addressing research questions that aim to shed light on a poorly understood field of study rather than a particular phenomenon, a qualitative descriptive study is a significant and suitable design.

8.4 PERSONAL DOCUMENTS

Dear learners, personal documents are secondary source of qualitative data which include letters, diaries, journals, photos, and more recently, digital accounts like blogs and vlogs. Their goal is to provide an understanding of other people's lives, with a focus on the motivations and meanings that people have for themselves and how they interpret society.

8.3.1 Strengths of personal documents

- **Rich Insights:** They provide a depth of insight into individual experiences and social contexts that is often unattainable through other data sources.
- **Authenticit**y: Personal documents are created for personal reasons, not for public consumption, which often results in more honest and less censored content.
- **First-Person Perspective**: They offer a unique first-person viewpoint, giving researchers direct access to the thoughts, feelings, and experiences of individuals.
- **Emotional Depth**: These documents can reveal the emotional states and personal narratives that enrich the understanding of quantitative data.
- **Historical Context**: They can provide historical context and continuity,

connecting past events to present research inquiries.

8.4.2 Limitations of Personal Documents

- **Subjectivity:** Personal documents are inherently subjective, reflecting the perspective and biases of the author, which can influence the research findings.
- **Authenticity and Accuracy**: The veracity of personal documents can be questionable. There's often no way to verify the truthfulness of the contents.
- **Representativeness**: Personal documents may not be representative of the broader population or other individuals experiences.
- **Access and Privacy** : Gaining access to personal documents can be difficult due to privacy concerns or the documents being private property.
- **Time-Consuming Analysis**: Analyzing personal documents can be time-consuming, as they often contain rich, complex narratives that require in-depth examination.
- **Non-standardiztion**: Each personal document is unique, which can make systematic analysis and comparison challenging.

8.5 OFFICIAL DOCUMENTS

In qualitative research, official documents refer to a variety of written materials produced by organizations, institutions, or government bodies. These can include reports, policy documents, minutes of meetings, official statistics, newsletters, and other formal records. They serve as a valuable source of data for researchers looking to understand the official perspective, policies, and procedures related to a particular topic or issue. Official documents are systematic records created by public or private organizations that provide formal evidence of activities, decisions and operations.

Official documents are considered more objective than personal documents because they are often created with the intention of public record or organizational memory.

8.5.1 Strengths of official documents

- **Authenticity**: Official documents are generally authentic and reliable sources of information as they are issued by authoritative bodies.
- **Comprehensive Coverage**: They often provide comprehensive coverage of the topics they address, which can include detailed statistics, legal decisions, and policy statements.
- **Standardization**: There is a level of standardization in official documents, which means they follow certain formats and protocols, making them easier to analyze systematically.
- **Public Accessibility**: Many official documents are publicly accessible, allowing for transparency and scrutiny by anyone interested in the information they contain.
- **Historical Value** : They serve as permanent records and are valuable for historical research, providing insights into the societal, legal, and governmental contexts of different time periods.
- **Legal Authority**: Official documents often carry legal authority and can be used as evidence in legal proceedings or policy formulation

8.6 FIELD NOTES

Field notes are an essential component of many research studies, particularly qualitative investigations. In essence, field notes are the researcher's documented account of the things they saw, felt, and learned while doing research in the field.

The events, discussions, and behaviours that the researcher witnesses in the field are documented in field notes, along with the researcher's observations and analysis of them. The environment, the researcher, and the subjects being observed will all influence where and when field notes are recorded.

In order to serve as discreet reminders for thorough field notes to be completed right away following each data collection session, researchers will occasionally jot down memos or keywords in the setting. Comprehensive field notes should contain all relevant information, such as the event's date, location, participants, nature, and any triggers that may have caused it.

Immediately upon leaving the environment, some researchers record their observations and reflections using audio recorders.

8.7 PHOTOGRAPHS

According to Barbour (2014), visual approaches such as photography, film, video, painting, drawing, collage, sculpture, artwork, graffiti, advertising, and cartoons are used to comprehend and interpret images. A fresh and innovative approach to qualitative research, visual methodologies are based on the conventional ethnography techniques used in sociology and anthropology. The following factors have led to a rise in interest in qualitative research employing visual methods (Barbour, 2014).

- By providing an additional dimension (Balmer, Griffiths, & Dunn, 2015),
- Capturing rich multidimensional data (Mah, 2015), and
- Offering insightful information about participants' daily lives (Barbour, 2014),
- They enhance the value of already-existing methods.

Visual methods are becoming more popular across a variety of disciplines and are an effective and acceptable method for qualitative research In qualitative research, two particular visual techniques that can be applied are:

1. Autophotography and
2. Photo elicitation.

Autophotography is an ethnographic research method that allows the researcher and reader to experience the world through the participant's eye through the use of photography. In the 19th century, autophotography emerged in anthropology as a result of the widespread use of field photos taken by researchers to illustrate native cultures abroad to audiences. (Thomas, 2009).

These days, photos from fieldwork—which may be taken by participants—are utilised as actual data, especially in ethnographic research (Thomas, 2009). Words are unable to capture the depth and detail that photographs can (Guest, Namey, & Mitchell, 2013, p. 239).Since autophotography does not require participants to speak for themselves, it has emerged as a valuable tool for bridging gaps between underrepresented groups in research.

The process of eliciting verbal discussion through photos is known as photo elicitation (Thomas, 2009). Either the researcher or the informant may create the visual representations. Today, photo elicitation is a well-known and often employed technique that entails showing one or more visual images to participants during an interview and then asking them to comment on the images (Bigante, 2010).

8.7.1 Strengths

Photographs can be a powerful tool in qualitative research for various reasons, offering a range of strengths that can enrich and deepen the research process. Here are some key strengths:

- **Rich Data Source:** Photographs capture intricate details and contexts that words alone may not convey. They provide a visual richness that can bring depth and nuance to qualitative data.
- **Improving Recall and Reflection:** When participants are shown photographs during interviews or focus groups, it can trigger memories and encourage more detailed and accurate recall, enhancing the richness of the data collected.
- **Contextual Understanding:** Photographs can situate participants and their experiences within a broader social, cultural, or environmental context. This helps researchers understand the setting and circumstances in which participants live or work.
- **Eliciting Emotional Responses:** Visual images can evoke emotions and reactions that might not surface through verbal questioning alone. This can lead to a deeper understanding of participants' feelings and viewpoints.
- **Non-Verbal Communication:** Photos can convey meanings, themes, and patterns that might not be easily articulated by participants, especially when language barriers or literacy issues are present.
- **Cross-Cultural Research:** In cross-cultural research, photographs can bridge language differences and provide a common ground for discussion.
- **Documenting change over Time**: Photographic documentation can be

used to track changes over time, providing visual evidence of shifts in environments, behaviors, or conditions.

- **Supporting Evidence and Validation**: Photographs can corroborate or validate findings from other data sources, adding credibility and supporting triangulation in qualitative research.

8.8 DIFFERENCE BETWEEN QUANTITATIVE RESEARCH AND QUALITATIVE RESEARCH

Learners as you know that the Quantitative and qualitative research are two distinct approaches to gathering and analyzing data. Know we will discuss about differences between the two approaches.

S.No.	Quantitative Research	Qualitative Research
1	Focuses on numbers and statistics	Focuses on words and meanings.
2	Used to test or confirm theories and assumptions.	Used to understand concepts, thoughts, or experiences.
3	Aims to establish generalizable facts about a topic.	Aims to gather in-depth insights on topics that are not well understood.
4	Methods include experiments, surveys with closed-ended questions, and observations recorded as numbers	Methods include interviews with open-ended questions, observations described in words, and literature reviews
5	Seeks to identify patterns, test hypotheses, and make predictions.	Seeks to produce rich, detailed descriptions and uncover new insights.
6	Data is often presented in graphs and charts.	Data can include text, video, photographs, or audio recordings.
7	Risks include information bias, sampling bias, and selection bias	Risks include observer bias, recall bias, and social desirability bias

8.9 LET US SUM UP

In essence, quantitative research quantifies the data and generalizes results from a sample to the population of interest, while qualitative research provides a deeper understanding of the human experience through a detailed analysis of non-numerical data. Both methods have their own strengths and are often used complementarily to provide a fuller understanding of the research topic.

8.10 SELF –ASSESSMENT QUESTIONS

Note: Compare your answers with those given at the end of lesson.

Q1. Describe how, in contrast to other data sources, personal documents can provide researchers with unique insights into individual experiences and social contexts?

Q2. What are some strengths of using official documents as a source of qualitative data? Provide examples to illustrate these strengths?

Q3. Describe the function and information included in field notes for qualitative research. What is the significance of field notes in gathering data in the field?

Q4. Discuss how photographs can enrich qualitative data collection.

Q5. Describe some of the main distinctions between the data types used in qualitative and quantitative research. How does the presentation of data differ in these two approaches?

EXPECTED ANSWERS TO CHECK THE PROGRESS OF LEARNERS

1. (a) Educational Level - Ordinal

   (b) Types of Cuisine – Nominal

2. Nominal Data Example: (Red, Blue, Green, etc.)

   Explanation: This question generates nominal data because the responses are categories that do not have any inherent order or ranking.

Ordinal Data Example:

Question: On a scale of 1 to 5, how satisfied are you with our service?

(1 = Very Unsatisfied, 5 = Very Satisfied)"

Explanation: This question generates ordinal data because the responses can be

ordered or ranked, but the differences between the levels are not necessarily

equal or quantifiable.

3. Personal documents provide firsthand, unfiltered perspectives on individuals' lives, offering emotional depth and historical context that can enrich understanding beyond quantitative data.

4. Strengths of the official documents include authenticity, comprehensive coverage, standardization, public accessibility, historical value, and legal authority. Examples can include policy documents, reports, and official statistics.

5. Field notes document the researcher's observations, experiences, and analysis in the field, capturing events, discussions, behaviors, and environmental influences. They are essential for recording rich, contextual data in real-time.

6. Photographs as a qualitative data collection tools helps in capturing rich details, improving recall and reflection, providing contextual understanding, eliciting emotional responses, and supporting evidence/validation.

7. Quantitative research uses numbers and statistics, while qualitative research focuses on words and meanings. Data in quantitative research is often presented in graphs and charts, while qualitative data can include text, video, photographs, or audio recordings.

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TOOLS OF EDUCATIONAL RESEARCH

Unit: III **Lesson No.: 9**

Structure

9.1 INTRODUCTION

Educational research utilizes various tools to gather data and insights

about educational practices, systems, and learning processes. These tools encompass a range of methods and instruments used to collect information, analyze data, and draw conclusions in the field of education. Educational research tools encompass a wide spectrum of methodologies, ranging from quantitative (such as surveys, tests, and statistical analyses) to qualitative (like interviews, observations, and case studies). Each methodology involves specific instruments or techniques designed to collect data relevant to the research objectives.

9.2 LEARNING OBJECTIVES

Students after reading this topic will be able to:

- ✓ To be able for understanding the specific purpose of each tool in educational research.
- ✓ To be able to identify and describe the key characteristics unique to each tool.
- ✓ To develop competence in designing information schedules, questionnaires, opinionnaires, and interview guides tailored to research objectives.
- ✓ To demonstrate the practical application of these tools by conducting mock exercises or small-scale research projects.
- ✓ To critically evaluate the strengths and limitations of each tool, considering factors like bias, reliability, validity, and ethical considerations in data collection.

9.3 MEANING

Tools of educational research refer to the methodologies, instruments, and techniques employed to gather, analyze, and interpret data related to educational phenomena. These tools help researchers investigate aspects such as teaching methodologies, student learning outcomes, curriculum effectiveness, educational policies, and more. These tools are utilized to collect diverse types of data, including quantitative data (numbers, statistics) and qualitative data (descriptive or narrative information). The collected data is subsequently analyzed using appropriate analytical methods to derive meaningful insights, patterns, or conclusions. Educational research tools are tailored to serve various

purposes, such as assessing the effectiveness of teaching methods, understanding student attitudes and perceptions, evaluating educational policies, examining learning outcomes, exploring factors influencing academic achievement, and investigating the impact of interventions or programs. Researchers have the flexibility to adapt and customize these tools to suit specific research contexts, demographics, cultural nuances, or educational settings. For instance, a questionnaire designed for primary school students may differ significantly from one intended for university professors.

9.4 CHARACTERISTICS OF TOOLS USED IN EDUCATIONAL RESEARCH

The characteristics of tools used in educational research encompass several key aspects that define their utility, adaptability, and efficacy in collecting and analyzing data within the educational context:

1) **Diversity of Methods:** Educational research tools encompass a wide range of methodologies, including surveys, experiments, observations, interviews, case studies, and standardized tests. This diversity allows researchers to choose the most suitable method based on their research objectives, the nature of the study, and the target audience.
2) **Customization and Adaptability:** These tools can be adapted and tailored to suit different educational settings, age groups, cultural backgrounds, and research purposes. Researchers can modify questions, formats, or methodologies to align with the specific context of their study.
3) **Validity and Reliability:** Effective tools ensure high standards of validity (the accuracy of measuring what they are intended to measure) and reliability (consistency in producing similar results under similar conditions). This ensures that the data collected is credible and consistent, enhancing the trustworthiness of research findings.
4) **Structured Approach:** Many tools follow a structured format or protocol to ensure systematic data collection. This structured approach helps maintain consistency and allows for easier comparison and analysis of collected data.
5) **Ethical Considerations:** The use of these tools is governed by ethical guidelines, emphasizing the importance of obtaining informed consent, respecting participants' privacy and confidentiality, and ensuring the

well-being of participants throughout the research process.

6) **Analytical Possibilities:** The data collected through these tools can be analyzed using various analytical methods, including statistical analysis, thematic coding, content analysis, or mixed-method approaches. This allows for deeper exploration and interpretation of the gathered information.

7) **Purpose-Driven Functionality:** Each tool serves a specific purpose within the research process. For instance, questionnaires are useful for gathering quantitative data on a large scale, while interviews provide in-depth qualitative insights. Researchers choose tools based on their research questions and the type of information they aim to collect.

Understanding these characteristics is vital for researchers and educators, as it empowers them to select and employ the most appropriate tools for their research endeavors, ensuring the validity, reliability, and ethical conduct of their studies within the field of education.

9.5 TOOLS OF EDUCATIONAL RESEARCH:

Educational research employs various tools/methods for data collection, analysis, and interpretation. Here are some common tools used in educational research:

i) Information Schedule
ii) Questionnaire
iii) Opinionnaire
iv) Interview

9.6 MEANING AND CHARACTERISTICS OF INFORMATION SCHEDULE

An information schedule is a structured tool used in educational research to collect specific factual data or information from individuals or institutions. It typically comprises a pre-designed form or document containing a set of predetermined questions or fields aiming to gather standardized information. Information schedules are often used to gather quantitative data or factual details, such as demographic information, institutional statistics, program details, resource allocation, facilities, or other factual data relevant to the research objectives. Researchers utilize information schedules to systematically gather consistent and standardized information from various sources, enabling

them to analyze and interpret the collected data for research purposes. These schedules can be tailored to suit the specific requirements of the research study, ensuring that the information collected is relevant and aligned with the research goals.

In educational research, an information schedule serves as a structured tool designed to systematically collect specific factual data or information from educational institutions, stakeholders, or individuals. This tool is used to gather quantitative data related to various aspects within educational settings, including:

I. **Institutional Details:** Information schedules can gather institutional data such as school or university statistics, administrative information, infrastructure details, staffing information, budget allocation, and resources available. Institutional details refer to specific factual information and characteristics associated with educational institutions. These details encompass a wide range of data points that provide insights into the structure, operations, and demographics of an educational establishment. Here are some aspects typically included in institutional details:

- **Basic Information:** This includes the name, address, contact details, and type of educational institution (e.g., school, college, university).
- **Administrative Structure:** Information about the organizational structure, leadership hierarchy, departments, and administrative divisions within the institution.
- **Enrollment Statistics**: Data related to the total number of students enrolled, their distribution across different grades, programs, or courses offered by the institution.
- **Staffing and Faculty:** Details about the number of teachers, professors, administrators, and support staff, along with their qualifications and areas of expertise.
- **Infrastructure and Facilities:** Information regarding the physical infrastructure, facilities available (like libraries, laboratories, sports facilities), and resources provided to support learning.
- **Financial Information:** Data about the institution's budget, funding

sources, allocations for various programs or departments, and financial aid programs available to students.

- **Accreditation and Certifications:** Details about the institution's accreditation status, affiliations with educational boards, or certifications obtained.
- **Policies and Procedures:** Information about the institutional policies, rules, regulations, and procedures governing students, staff, curriculum, disciplinary actions, etc.
- **Demographic Profile:** Data on student demographics, including age distribution, gender, ethnicity, socio-economic background, and geographical diversity.

II. Program Characteristics: Researchers use information schedules to collect data regarding educational programs, curriculum structures, course offerings, instructional methodologies, assessment systems, and extracurricular activities. Program characteristics in educational research refer to specific attributes, components, or features that define and describe an educational program or curriculum offered within an institution. These characteristics provide insights into the structure, content, delivery methods, and objectives of the educational programs. Here are some key aspects typically included in program characteristics:

- **Curriculum Structure:** Details about the overall design and organization of the curriculum, including the sequence of courses, subjects offered, and academic requirements.
- **Course Offerings:** Information about individual courses or modules within the program, including course titles, descriptions, objectives, and credit hours.
- **Instructional Methods:** Details on the teaching methodologies, approaches, or pedagogical strategies used to deliver the curriculum (e.g., lectures, seminars, practical sessions, online learning).
- **Assessment and Evaluation:** Information about the methods used for student assessment, grading systems, evaluation criteria, and examinations conducted within the program. **Learning Resources:** Availability and utilization of educational resources such as textbooks, online materials, libraries, laboratories, technology, and other learning

aids supporting the curriculum.

- **Program Objectives and Outcomes:** Clear articulation of the program's educational goals, learning outcomes, skills or competencies developed, and the alignment with broader educational objectives.
- **Special Programs or Initiatives:** Details about any specialized programs, extracurricular activities, internships, research opportunities, or experiential learning components integrated into the curriculum.
- **Adaptability and Flexibility:** Information regarding the adaptability of the program to diverse learning styles, the possibility of customization, or options for specialized tracks or concentrations within the curriculum.
- **Alignment with Standards or Frameworks:** Connection of the program with educational standards, national frameworks, industry requirements, or professional accreditation standards.
- **Feedback Mechanisms:** Existence of mechanisms for gathering feedback from students, faculty, or stakeholders to evaluate the effectiveness of the program and make improvements.

III. Demographic Information: These schedules might include questions about student demographics, such as age groups, gender distribution, socio-economic backgrounds, or ethnic diversity within the educational institution. Collecting demographic information is crucial in educational research as it helps researchers:

- Understand the diversity and composition of the population within educational institutions.
- Analyze how demographic factors might influence educational outcomes, experiences, or disparities.
- Tailor educational interventions, policies, or programs to cater to the diverse needs of the student population.
- Identify and address potential inequities or gaps in access to education based on demographic characteristics.

IV. Resource Allocation: Information schedules can inquire about the allocation of resources like funding, technology, libraries, laboratories, or other educational materials available to students and educators. Understanding resource allocation in educational research is crucial as it helps researchers:

- Evaluate the adequacy and effectiveness of resource distribution within educational institutions.
- Analyze the impact of resource allocation on student learning outcomes, academic performance, and overall educational experiences.
- Identify areas where resource disparities or inadequacies may exist and propose strategies for equitable resource distribution.
- Assess the alignment of resource allocation with institutional goals, educational objectives, and the needs of the educational community.

V. Policies and Procedures: Researchers might use information schedules to collect data on institutional policies, rules, regulations, and procedures governing various aspects of the educational environment. Understanding and analyzing policies and procedures in educational research is important as it allows researchers to:

- Evaluate the impact of institutional policies on student outcomes, faculty-student interactions, and the overall learning environment.
- Assess the alignment of policies with educational goals, ethical standards, and legal requirements.
- Identify areas where policy implementation may affect educational practices, equity, or student experiences.
- Propose recommendations for policy improvements or changes based on research findings to enhance the educational institution's effectiveness and compliance.

- Analyzing policies and procedures within educational settings contributes to fostering a conducive learning environment, ensuring accountability, and promoting fairness and transparency within the institution.

The concept revolves around using a standardized format containing specific fields or questions to collect consistent, factual, and reliable information. This data, once collected through information schedules, can be analyzed to understand trends, make comparisons, identify patterns, or evaluate the effectiveness of educational practices or policies. And by employing information schedules, researchers can systematically gather and organize

factual data from multiple sources within educational contexts. This aids in conducting comprehensive analyses, making informed decisions, and contributing to the improvement and advancement of educational systems and practices.

9.7 CHECK YOUR PROGRESS -1

True/False Questions

1. A Schedule is a tool used in educational research where the interviewers personally asked questions and records the responses.

2. In an interview schedule, the questions are predetermined and presented in a structured format, insuring consistency in data collection.

3. An inventory is the tool used to assess interests, attitudes, or personality traits of individuals.

4. A rating scale is used to measure the intensity or degree of a particular attribute, such as satisfaction or agreement.

9.8 QUESTIONNAIRE: MEANING AND CHARACTERISTICS

A ***questionnaire*** is a structured research tool used to collect data and gather information from individuals or groups within a standardized format. It typically consists of a set of written questions or items presented to respondents, aiming to elicit specific information, opinions, attitudes, behaviors, or characteristics. The concept of a questionnaire revolves around several key aspects:

1) **Structured Format:** Questions within a questionnaire are organized systematically, often in a predetermined order, to maintain consistency and facilitate data collection.
2) **Standardization:** Questionnaires aim for uniformity in the questions asked and the response options provided to ensure that all respondents receive the same set of questions in the same manner.
3) **Closed and Open-ended Questions:** Questionnaires may contain closed-ended questions (multiple-choice, Likert scale, yes/no) with predefined response options or open-ended questions that allow respondents to provide detailed, free-form responses.

4) **Research Objectives:** Questionnaires are designed with specific research objectives in mind, tailored to gather information relevant to the research topic, hypothesis, or study goals.

5) **Quantitative or Qualitative Data:** Depending on the nature of questions, questionnaires can collect quantitative data (numeric data for statistical analysis) or qualitative data (descriptive information and opinions) from respondents.

6) **Response Bias Consideration:** Questionnaire designers aim to minimize response bias by phrasing questions neutrally, avoiding leading questions, and ensuring clarity to obtain accurate and unbiased responses.

7) **Applicability:** Questionnaires can be administered in various formats - paper-based, online, or through interviews where the questions are read aloud. This adaptability allows for flexibility in data collection methods.

8) **Data Analysis:** The collected responses from questionnaires can be quantitatively analyzed using statistical tools or qualitatively analyzed for thematic content, aiding in drawing conclusions or making interpretations.

Questionnaires are widely used in educational research to gather information from students, teachers, administrators, or stakeholders on a range of educational topics such as learning preferences, satisfaction with programs, opinions on teaching methodologies, or attitudes towards educational policies. They offer an efficient means of systematically collecting data from a large number of respondents while allowing researchers to tailor questions to specific research needs.

Questionnaires serve as a valuable tool in educational research by facilitating the systematic collection of data from students, educators, administrators, and other stakeholders within educational settings**. Here's how questionnaires are utilized in educational research:**

- ✓ **Gathering Student Feedback:** Questionnaires are used to collect feedback from students about their learning experiences, satisfaction with courses, preferences for teaching methods, and overall educational environment.

- ✓ **Assessing Learning Outcomes:** Researchers employ questionnaires to assess the effectiveness of educational programs, curriculum

components, or specific teaching interventions in achieving learning outcomes.

- ✓ **Measuring Attitudes and Perceptions:** Questionnaires help gauge attitudes, perceptions, and beliefs of students, teachers, or parents towards educational policies, initiatives, or specific topics within the educational system.
- ✓ **Identifying Needs and Challenges:** Educational research often uses questionnaires to identify the needs, challenges, or concerns of students, educators, or institutions, assisting in addressing issues and planning improvements.
- ✓ **Evaluating Teaching Effectiveness:** Questionnaires designed for peer or student evaluation of teaching methods and faculty performance aid in assessing teaching effectiveness and guiding professional development efforts.
- ✓ **Assessing Institutional Climate:** Surveys and questionnaires help measure the institutional climate, including factors like campus culture, inclusivity, safety, and student engagement.
- ✓ **Gathering Demographic Information:** Questionnaires assist in collecting demographic data such as age, gender, socio-economic status, or cultural background, aiding in understanding the diverse characteristics of the educational community.
- ✓ **Researching Behavioral Patterns:** Researchers use questionnaires to investigate behavioral patterns, study habits, or factors influencing academic success among students.
- ✓ **Informing Policy and Decision-Making**: Data collected through questionnaires provides insights that inform educational policies, institutional planning, and decision-making processes based on evidence-driven practices.
- ✓ **Longitudinal Studies:** Questionnaires can be employed in longitudinal studies to track changes, trends, or developments in educational settings over time, providing valuable longitudinal data.

Through utilizing questionnaires in educational research, researchers can efficiently gather large amounts of data, analyze trends, identify patterns, and make informed decisions aimed at improving educational practices, policies, and outcomes within educational institutions.

9.9 OPINIONNAIRE MEANING & CHARACTERISTICS

An opinionnaire is a specialized form of questionnaire designed specifically to gather opinions, beliefs, attitudes, or subjective viewpoints on particular issues, topics, or policies. It's a structured tool used in research to collect qualitative or quantitative data about the opinions and perspectives of individuals regarding a specific subject matter.

The concept of an opinionnaire revolves around several key characteristics:

1. **Focused on Opinions:** Unlike traditional questionnaires that may cover various aspects, an opinionnaire concentrates specifically on collecting opinions, beliefs, or subjective viewpoints on a particular topic or issue.
2. **Structured Format:** Opinionnaires are organized with structured questions aimed at exploring attitudes, preferences, perceptions, or sentiments. These questions might include Likert scale items, agree/disagree statements, or open-ended prompts.
3. **Targeted Subject Matter:** Opinionnaires are tailored to address a specific research focus or subject area. They aim to probe respondents' thoughts and feelings on that particular topic comprehensively.
4. **Qualitative and Quantitative Insights:** Depending on the nature of questions, opinionnaires can gather qualitative insights through open-ended questions or quantitative data using scaled responses.
5. **Objective Assessment of Opinions:** Opinionnaires assist researchers in objectively assessing and analyzing diverse opinions and perspectives, providing insights into the range and depth of viewpoints within a given population.
6. **Analysis of Trends or Patterns**: Data collected through opinionnaires can be analyzed to identify trends, patterns, or variations in opinions across different demographic groups or over time.
7. **Aiding Decision-making Processes:** The collected opinions serve as valuable inputs for decision-makers, policymakers, or stakeholders involved in making informed decisions based on public or expert opinions.

Opinionnaires are commonly used in educational research to gather viewpoints on educational policies, teaching methodologies, school climate,

student satisfaction, or other educational issues. They offer researchers a structured means to delve into the subjective perceptions and attitudes of individuals within educational settings, contributing to a comprehensive understanding of various viewpoints and guiding potential improvements or changes based on collected opinions. Opinionnaires are valuable tools in educational research, offering a structured method to gather subjective viewpoints, attitudes, and beliefs of individuals within educational settings. Following let us know how opinionnaires are used as a tool in educational research:

- **Assessing Perceptions and Attitudes:** Opinionnaires help researchers gauge the perceptions, attitudes, and opinions of students, educators, parents, or stakeholders towards specific educational policies, practices, or initiatives.
- **Evaluating Educational Programs:** Researchers use opinionnaires to assess stakeholders' opinions about the effectiveness, relevance, or impact of educational programs, interventions, or curricular changes.
- **Measuring Satisfaction and Engagement:** Opinionnaires are employed to measure levels of student satisfaction, engagement, or motivation within educational environments, helping identify areas for improvement.
- **Understanding Climate and Culture:** Researchers use opinionnaires to assess the institutional climate, school culture, inclusivity, or the overall atmosphere within educational institutions.
- **Identifying Concerns and Challenges**: Opinionnaires aid in identifying concerns, challenges, or issues faced by students, educators, or institutions, providing insights for addressing these challenges effectively.
- **Gathering Feedback on Teaching Methods**: Opinionnaires designed for evaluating teaching methods or courses collect feedback from students about their experiences, preferences, and suggestions for improvement.
- **Exploring Social and Behavioral Issues**: Opinionnaires are utilized to delve into social issues, behavioral patterns, attitudes towards learning, or student well-being within educational contexts.
- **Informing Decision-Making:** The data collected through

opinionnaires informs decision-makers, policymakers, or educational leaders about the perceptions and opinions of stakeholders, guiding decision-making processes.

- **Comparing Perspectives:** Opinionnaires allow researchers to compare and analyze the diverse viewpoints and attitudes of different groups or demographics within the educational community.
- **Driving Improvement Strategies:** Insights derived from opinionnaires aid in formulating strategies, interventions, or policies aimed at improving educational practices, enhancing student experiences, and fostering a conducive learning environment.

Utilizing opinionnaires in educational research, researchers gain a deeper understanding of subjective viewpoints and attitudes within educational settings. This information supports evidence-based decision-making, drives improvements in educational practices, and contributes to creating more effective and responsive educational environments.

9.10 MEANING OF INTERVIEW AND ITS CHARACTERISTICS

An ***interview*** in the context of research is a structured or semi-structured conversation between a researcher (interviewer) and a participant or group of participants (interviewee[s]). The concept of an interview revolves around the following key characteristics:

1) **Qualitative Data Collection:** Interviews are a qualitative research method aimed at gathering in-depth information, insights, perspectives, opinions, or experiences from participants.

2) **Structured or Semi-Structured Format:** Interviews can follow a structured format with predetermined questions, a semi-structured format with a set of topics to cover, or an unstructured format allowing for open-ended discussion.

3) **Two-Way Communication:** Interviews involve interactive communication between the interviewer and interviewee, allowing for clarification, probing, and follow-up questions to delve deeper into responses.

4) **Flexibility and Adaptability:** Interviewers can adapt the interview format, questions, or conversation based on the participant's responses,

facilitating a more organic exploration of the topic.

5) **Building Rapport:** Establishing rapport and trust between the interviewer and interviewee is crucial to encourage openness and honesty in sharing information.
6) **Varied Interview Types:** Interviews can take various forms, such as individual interviews, group interviews, structured interviews, unstructured interviews, or focused interviews targeting specific themes or topics.
7) **Qualitative Analysis:** Data collected through interviews is analyzed qualitatively, often involving thematic analysis, content analysis, or identifying patterns and themes in the responses.
8) **Ethical Considerations:** Interviewers adhere to ethical guidelines, ensuring informed consent, confidentiality, respect for participants' rights, and protection from harm during the interview process.
9) **In-depth Understanding:** Interviews aim to provide a comprehensive and nuanced understanding of participants' thoughts, perspectives, motivations, or experiences related to the research topic.

Interviews are widely used in educational research to explore a range of topics, including student experiences, teacher perspectives, educational policies, learning methodologies, or issues within educational systems. The concept of an interview as a research tool allows researchers to gather rich, detailed qualitative data, providing deeper insights and understanding of complex phenomena within educational contexts.

Interviews in educational research, serve as a valuable tool for gathering rich, qualitative data from various stakeholders within educational settings. Here's how interviews are utilized as a tool in educational research:

- **Exploring Perspectives:** Interviews are used to explore the viewpoints, experiences, and perspectives of students, teachers, administrators, parents, or other stakeholders regarding specific educational topics, practices, or policies.
- **Understanding Experiences:** Researchers conduct interviews to delve deeper into individuals' experiences within educational environments, such as learning challenges, successes, motivations, or interactions.
- **Assessing Teaching and Learning:** Interviews aid in evaluating

teaching methodologies, pedagogical approaches, and the learning experiences of students, providing insights into effective teaching practices.

- **Gathering Insights on Curriculum:** Researchers use interviews to gather information on the effectiveness of educational curricula, suggestions for improvements, or alignment with learning objectives.
- **Evaluating Educational Programs:** Interviews help in assessing the impact, relevance, or effectiveness of educational programs, interventions, or initiatives from the perspectives of stakeholders.
- **Identifying Challenges and Needs:** Interviews are conducted to identify challenges, needs, concerns, or gaps within educational systems, providing information to address these issues effectively.
- **Stakeholder Engagement:** Interviewing stakeholders fosters engagement and participation, allowing them to voice their opinions, concerns, or suggestions for educational improvement.
- **Policy Assessment:** Interviews aid in assessing the implications of educational policies or reforms on stakeholders and their perceptions of policy implementation.
- **In-depth Exploration:** Interviews provide a platform for in-depth exploration of specific educational topics, allowing researchers to probe and gain a deeper understanding of complex issues.
- **Data Complementarity:** Interviews complement other quantitative data by providing context, narratives, and personal insights, creating a comprehensive understanding of educational phenomena.

Employing interviews in educational research, researchers can gather nuanced, context-rich data that enriches the understanding of educational processes, practices, and experiences. This qualitative data contributes to evidence-based decision-making, policy formulation, and the improvement of educational systems and practices.

9.11 Check Your Progress 2

1. What is questionnaire?
2. Mention one characteristics of an opinionnaire.
3. Why are interviews important in research?

4. List one characteristics of a good interview.

9.12 LET US SUM UP

1. Tools are used to gather data and insights about educational practices, systems, and learning processes. Tools" refer to various instruments, techniques, software, and methodologies that researchers use to conduct their studies, analyze data, and communicate their findings.
2. Tools used in research can vary widely depending on the discipline and specific needs of the study. The characteristics of tools used in educational research comprises of several key aspects that define their utility, adaptability, and efficacy in collecting and analyzing data within the educational context.
3. Opinionnaire is a specialized form of questionnaire designed specifically to gather opinions, beliefs, attitudes, or subjective viewpoints on particular issues, topics, or policies.
4. A questionnaire is a structured research tool used to collect data and gather information from individuals or groups within a standardized format. It typically consists of a set of written questions or items presented to respondents, aiming to elicit specific information, opinions, attitudes, behaviors, or characteristics.
5. An information schedule is a structured tool used in educational research to collect specific factual data or information from individuals or institutions. It typically comprises a pre-designed form or document containing a set of predetermined questions or fields aiming to gather standardized information.
6. An interview in the context of research is a structured or semi-structured conversation between a researcher (interviewer) and a participant or group of participants (interviewee).

9.13 Keywords/Glossary

1. Learning Style Inventories
2. Digital Devices
3. Data Collection
4. Gauge Attitudes
5. Research

9.14 Self-Assesment Questions

1. What is the purpose of research tools ?
2. What are the characteristics of research tools?
3. Can you explain the different tools used in educational research?
4. Describe in your own words the Questionnaire?
5. How Opinionnaire is different from Questionnaire?
6. In which type of research we use information schedule and why?

9.15 SUGGESTED READINGS

- Teacher Effectiveness Tool, (2024), By Prof.M.M.Mattoo and Dr Aneet Thakur. National Psychological Corporation.
- Doing Educational Research: A Handbook" by Geoffrey Walford A practical handbook that guides researchers through the process of conducting educational research, from conceptualizing research questions to analyzing data and writing research reports.
- The Handbook of Educational Research: A Guide to Methods and Methodologies" edited by Dominic Wyse, Neil Selwyn, Emma Smith, and Larry E. Suter.
- Educational Research: Competencies for Analysis and Applications" by Lorraine R. Gay, Geoffrey E. Mills, and Peter W. Airasian.
- Introduction to Research in Education" by Donald Ary, Lucy Cheser Jacobs, and Christine K. Sorensen.
- Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research" by John W. Creswell and Educational Researcher.

OBSERVATION

Unit: III **Lesson No.: 10**

STRUCTURE

10.1 INTRODUCTION

Observation is one of the principal techniques of research in social sciences. Some of the difficulties arising out of the use of interviewing in sociological data

– data collection can be overcome by combining observation with interviewing or perhaps by using observation alone. In fact, observation is essential for any scientific study or research. Science begins with observation and must ultimately return to observation for its final validation. Observation may take many forms and is at once the most primitive and the most modern of research techniques. It includes the most casual uncontrolled experiences as well as the most exact firm records of laboratory experimentation. Michael Quinn Patton (1986) has suggested the following five dimensions along with observations vary:

- **First**, the role of observer may vary from full participant to a complete outsider without disturbing the subjects who are observed. i.e., on looker observation as outsider.
- **Second**, the observer may conduct the observations covertly, having full knowledge of those being observed. Observer role is known by some, but not others.
- **Third**, those who are being observed may be given full explanations, partial explanations, no explanations, false explanations i.e., subjects are deceived as to the study purpose.
- **Fourth**, duration of observation is the fourth dimension. It may be single, several or long term.
- **Fifth**, the final dimension is focus of the observation. It may be narrow, expanded and broad focus.

Observation may vary from quite broad program to quite narrow event.

Observation is recognized as the most direct means of studying people when one is interested in their overt behaviour. It is more natural way of gathering data. Restrictions imposed in questionnaire or interview is missing in observation. Data collected through observation may be often more real and true than data collected by any other method. Observation is the most refined and modern research techniques. It is undoubtedly the first procedure of science as well as scientific data must originate in some experience or perception. As a scientific tool it may range from the most casual and uncontrolled to the most scientific and precise, involving modern mechanical and electronic means. It can be made progressively more scientific to meet the needs of the particular situation and observation is the fundamental tool even at the most advanced levels of science.

According to "P. G GISBERT", Observation consists in the application of our mind and its cognitive powers to the phenomena which we are

studying.

In general, we can say that observation is a systematic, direct, definite and deliberate examination of the spontaneous occurrences at the time of their occurrence.

10.2 OBJECTIVES

At the end of this topic the students will be able to:

- ❖ Describe the utility of observation as a tool of research.
- ❖ Explain the different characteristics of observation.
- ❖ Know the purpose of observation.
- ❖ Know the uses and limitations of observation.
- ❖ How rating scale can be used for data collection and analysis.
- ❖ Understand rating scale as a tool of research.
- ❖ Know the definition of socio metric technique.
- ❖ Understand how it can be used to measure social relationship.
- ❖ Understand attitude scales.
- ❖ Know how attitude scales can be used to measure one's attitude towards concepts.

10.3 CHARACTERISTICS OF OBSERVATION

- ✓ **Objectivity**: - Observation requires the observer to remain unbiased and not let personal opinions or pre conceived notions influence their observations. It is essential to refrain from making assumptions or judgements during the process.
- ✓ **Systematic**: - It is systematic and the length of observation periods, the interval between them and the number of observations are carefully planned. Some special factors are to be studied e. g studying of honest behaviour, sportsman spirit, leadership qualities etc.
- ✓ **Neutral**: - Observers should maintain a neutral stance during the observation process. This involves that observer should not favour any particular outcome.
- ✓ **Reliable: -** Observation should be reliable**,** meaning that it should produce consistent results when repeated under similar conditions by different observers.

- ✓ **Validity: -** Observation should strive to accurately reflect the phenomenon being observed. Valid observations contribute to the trustworthiness and credibility of the data collected.
- ✓ **Specific: -** Observation is specific and is directed at those specific aspects of the total situation which are assumed to be significant from the stand point of the purpose of the study.
- ✓ **Verifiable: -** It is verifiable and its result can be checked. It must comply with usual criteria of reliability, validity and usability. We can compare the results of different observers, or can repeat the study.
- ✓ **Systematic Recording: -** Observation should be recorded systematically using appropriate methods. It may include written notes, audio or video recordings, photographs, or other relevant means of documentation.
- ✓ **Flexible: -** Observer should be adaptable and open to adjusting their approach as needed. It allows for capturing unplanned events that may provide valuable insights.
- ✓ **Expert: -** Observation is an expert, accurate and recorded investigation. It deals with problems to be solved.
- ✓ **Collaborative Approach: -** In many cases, observation may involve multiple observers working together to increase the breadth and depth of the data collected. Collaboration enables shade perspectives and reduces the potential limitations of individual observations.

10.3.1 ADVANTAGES OF OBSERVATION

Observation plays an important role in both personal and professional settings whether it is in the field of business, science, or daily life. Some key advantages of observation are:

1. **Understanding Behaviour: -** Human behaviour is complex and multi-faceted. When we observe people's actions, body language, interactions, we can gain insights into their thoughts, feelings, motivations and intentions. This understanding of behaviour helps in building better Relationships and can form better communication strategies, and enhancing empathy towards others.
2. **Personal Development: -** Observation can be a better tool for self-reflection and personal growth. When we observe our own thoughts,

behaviour, and emotions, we can identify patterns and habits that may require adjustment or improvement.

3. **Awareness about Environment: -** It helps us to connect with our environment and to promote a deep understanding of the natural world and its processes. By observing the behaviour of animals, patters in weather, changes in the environment, we can gain valuable insights into ecological systems and contribute to sustainable practices.

4. **Critical Thinking: -** It promotes critical thinking by encouraging individuals to analyse and interpret the information they observe. It also helps to develop an anxious eye for detail, and ability to identify patterns and trends. This heightened critical thinking, facilitates problem - solving and decision-making skills.

5. **Gathering Information: -** Observation allows us to collect valuable data and information about people, objects, events and phenomenon. We can obtain accurate and reliable information that may not be accessible through other means. This information can be used for decision making and problem solving.

6. **Research and Investigation: -** It is an essential tool in various fields of research and investigation. Scientists can also use observation for making empirical observation, record data, and analyse patterns.

7. **Validating Hypothesis: -** In scientific research, observation is a crucial step in validating hypothesis and theories. By observing carefully controlled experiments, scientists can analyse the observed results and draw conclusions about the accuracy of their initial hypothesis. This process allows for the refinement of scientific knowledge and the advancement of various fields.

8. **Building Relationships: -** Observation plays a vital role in building and maintaining relationships. By attentively observing others reactions, needs, and preferences, we can adjust our own behaviour and communication to better connect with them. This observation stimulates understanding, empathy and effective interpersonal relationships.

Observation is a powerful tool that enables us to make better decisions, gain knowledge and enhance our understanding of the world around us. It can also lead to valuable insights, opportunities, and growth in both personal and professional spheres.

10.3.2 DISADVANTAGES OF OBSERVATION

Observation is a widely used method in different fields to gather information, and analyze events. However, like any other method, there are also some disadvantages linked with observation.

Limited sample size: Observation relies on a small sample size and it involves direct monitoring and analysis. This can limit the generalizability of the findings to a larger population.

Biasness: Observers may interpret events based on their own perspectives, beliefs, and biases, which can lead to inaccurate data collection.

Subjective: Data is often subjective as it relies on the observer's interpretation of events, making it less objective and reliable as compared to other data collection methods.

Time-consuming: Observation can be a time-consuming process, and it requires dedicated periods of time to observe and record data.

Observer's skills and experience: The quality of observational data relies on the observer's skills and experience. Inexperienced or inadequately trained observers may miss important details or misinterpret events.

Ethical concerns: Observational research, particularly in sensitive areas or private settings, can raise ethical concerns related to privacy and consent. Protecting the rights of individuals being observed can be challenging in some cases.

Limited access: Some situations or contexts may be inaccessible for direct observation due to logistical constraints, geographical barriers, or safety concerns. This limitation can restrict the use of observation as a data collection method.

Difficulty in documenting internal experiences: Observation mainly focuses on external behaviours and may struggle to capture internal experiences, thoughts, and emotions. This limitation can restrict the depth of understanding and analysis of the observed phenomena.

Despite having these disadvantages, it still remains a valuable method in many research settings. By understanding its limitations, researchers can make more informed decisions about when and how to use observation as a data collection method.

Observation is recognized as the most direct means of studying people when one is interested in their overt behaviour. It is more natural way of gathering data. Restrictions imposed in questionnaire or interview is missing in observation. Data collected through observation may be often more real and true than data collected by any other method. Observation is the most refined and modern research techniques**.**

Observation plays an important role in both personal and professional settings whether it is in the field of business, science, or daily life. Observation is a powerful tool that enables us to make better decisions, gain knowledge and enhance our understanding of the world around us. It can also lead to valuable insights, opportunities, and growth in both personal and professional spheres.

10.4 Check Your Progress 1

10.4.1.1What is the primary focus of the observation method in research?

10.4.1.2What type of data is typically collected through observation?

10.4.1.3Why is observation considered a valuable research method?

10.4.1.4How can observer's presence affect the study richness.

10.5 Rating Scale

- Rating scale is a tool used in research, surveys and assessments to measure and quantify different attributes or attitudes. It can be subjective or objective, and are often used to gather information about preferences, opinions, satisfaction levels or performance. Rating scale refers to a scale with a set of points which describe varying degrees of the dimension of an attribute being observed. It is a set of categories designed to represent the range of possible responses to a question or statement.

A rating scale is a method by which one systematises the expression of opinion concerning a trait. It comes in various forms, including numerical scales, semantic differential scales, Likert scales, and visual analogue scales. Numeric scales typically involve assigning a numerical value to responses, such as a 1-5 scale where 1 represents "strongly disagree" and 5 represent "strongly agree". Numerical scales are easiest to construct and to apply. They are simplest in terms of handling the results. However numerical scales are often rejected in favour of other types of scales because it is believed that they suffer from many biases and errors.

Likert scales are a type of rating scale that measures the intensity of agreement or disagreement with a series of statements. Semantic differential

scales use bipolar adjectives at each end of a scale to measure the attitudes and perceptions of respondents. Visual analogue scales allow respondents to indicate their level of agreement or satisfaction by marking a point on line.

The purpose of a rating scale is to capture the opinions, attitudes, or behaviours of individuals in a standardized and measurable way. Rating scales can be used in a wide variety of fields, including psychology, market research, education, health care and customer satisfaction assessments. When designing a rating scale, several factors should be considered to ensure its effectiveness and reliability. These include selecting the appropriate type of scale based on the research objectives, using clear and unambiguous language in the scale items, providing balanced response options, and considering the cultural and social context of the target population.

A rating scale is a valuable tool for measuring and quantifying different attributes, attitudes, and behaviours. It provides a structured and standardized way to gather data, allowing researchers and survey designers to gain insights into the preferences, opinions and satisfaction levels of the target population. The special feature of the rating scale is that the attitudes are evaluated not on the basis of opinions of the subjects but on the basis of the opinions and judgements of the experimenter himself.

In the rating scale the experimenter collects the data by means of non-verbal behaviour, clinical type interview, by personal documents, projective techniques etc.

- **According to Von Dallen,** "A rating scale ascertains the degree, intensity or frequency of a variable.
- **According to A. S. Bar,** "Rating is a term applied to expression of opinion or judgement regarding some situations, object or character. Opinions are usually expressed on a seal of values; rating techniques are devices by which such judgements may be quantified.

10.5.1 CONSTRUCTION OFA RATING SCALE

The following points may be kept in view while constructing a rating scale:

Identifying the purpose and objectives: - clarify the specific attributes, attitudes, or behaviours you intend to measure using the rating scale. Understand the research or assessment goals and the type of information you aim to gather.

Select the type of rating scale: - Choose the most suitable type of rating scale based on the research objectives, the nature of the information being measured, and the characteristics of the target population. Consider

whether a numeric scales, Likert scale, semantic differential scale, or visual analogue scale would be most appropriate for capturing the data you seek.

Consider balanced response set: - Make sure that the response options are balanced and cover the full spectrum of attitude or behaviour being measured. A balanced set of response options provides participants with clear and meaningful choices that accurately represent their view point.

Determine response options: - Choose the response options that will b available to participants. For numeric scales, decide on the range of numbers and whether it will be labeled with specific descriptors e.g 1=strongly disagree, 5= strongly agree. For Likert scales establish the intensity of agreement or disagreement e. g 5. Scale: strongly disagree, disagree, neutral, agree, strongly agree.

Adapt to cultural and social context: - Consider the cultural and social context of the target population when constricting the rating scale. Ensure that the items and response options are relevant, comprehensible, and culturally sensitive to the participants.

There are no hard and fast rules concerning the number of steps or scale divisions to be used in a rating scale. If the number of steps is too small, the raters are not capable of making much discrimination. On the other hand, too many steps in the scale are beyond the rates limited power of discrimination. In general, 5–7-point scales seem to serve adequately. When constructing a rating scale, it is crucial to maintain a focus on the specific objectives and the characteristics of the target population.

10.5.2 CHARACTERISTICS OF RATING SCALE

There are several characteristics of rating scales that are important to consider when designing and using them:

- Rating scales can have varying number of response options, ranging from a few to many. The number of response options used can impact the precision and sensitivity of the measurement. A Large number of response options can provide more detailed information.
- Response options on a rating scale can be labelled with descriptive words e. g very dissatisfied, somewhat dissatisfied, neither satisfied nor satisfied, somewhat satisfied, very satisfied, numerical values e.g 1-5 or a combination of both.
- The order of response options on a rating scale can vary, with options

presented in ascending or descending order. The order of response options can potentially influence respondent choices, so it's important to consider this when designing a rating scale.

- It's important for a rating scale to be reliable and valid. Reliability refers to the consistency of measurement while validity refers to the accuracy of the measurement in assessing the intended attribute. Establishing the reliability and validity of a rating scale is essential for ensuring that it measures what it is intended to measure in a consistent and accurate manner.
- Rating scales can be unipolar or bi polar. Unipolar scales only measure the presence or absence of an attribute, whereas bi polar scales measure the presence and absence of an attribute as well as its anti-thesis. E. g, a unipolar satisfaction scale might include options like not satisfied and satisfied, while a bi polar satisfaction scale might include options like very dissatisfied to very satisfied.
- Rating scales can be presented in different response formats, such as visual analogue scales, Likert scales, semantic differential scales, or numerical scales. Each format has unique characteristics and may be better suited for specific types of measurement or respondent populations.

Overall rating scales are a versatile and widely used method for collecting quantitative data on individual's attitudes, perceptions and behaviours. When designing and using rating scales, it's important to carefully consider the scales characteristics to ensure that it effectively captures the information of interest in a clear and reliable manner.

10.5.2 MERITS AND DEMERITS OF RATING SCALE

Merits: -

I. Rating scales can be used in various settings such as research surveys, performance evaluation, and customer feedback.

II. They provide a more objective measurement compared to open ended questions, as they limit the range of possible responses.

III. They have much wider range of application and can be used for teacher ratings, personality ratings, school appraisal, sociological surveys etc.

IV. The use of numerical scales allows for quantifiable data, which can be analysed and compared more easily.

V. The use of rating scales can lead to more consistent and reliable results, as they provide a structured way to collect data.

VI. Rating methods can be used with raters who have minimum of training.

VII. Rating scales offer clear communication by providing specific criteria for evaluation, which can help to reduce ambiguity.

VIII. Rating scales provide a standardized way of collecting feedback, making it easier to compare results across different subjects or time periods.

IX. Rating scales are effective for collecting data from a large number of respondents or subjects.

X. Rating scales are helpful in stimulating effect upon the individuals who are rated.

XI. Rating scales are also helpful in making recommendations to employees.

❖ **Demerits: -**

I. Rating scales are not as flexible as open-ended questions, making it challenging to capture nuanced responses.

II. They may lack the context needed to fully understand the reasoning behind a respondents rating.

III. Rating scales may not capture the full depth of a respondent's opinions or feelings on a subject, as they typically offer a limited range of responses.

IV. Respondents may be influenced by the position of the scale's anchors, leading to biased responses.

V. Rating scales may not always be culturally sensitive for all populations, potentially leading to biased results.

VI. Respondents may tend to select the middle option on a rating scale to avoid extreme positions, leading to biased results.

VII. Rating scales may not capture the emotional nuances of human experiences, leading to a lack of empathy and understanding.

Overall, while rating scales offer several benefits, they also have limitations that should be taken into consideration when using them for data collection and analysis.

Rating scale is a tool used in research, surveys and assessments to measure and quantify different attributes or attitudes. It can be subjective or objective, and are often used to gather information about preferences, opinions, satisfaction levels or performance. Rating scale refers to a scale with a set of points which

describe varying degrees of the dimension of an attribute being observed. A rating scale is a method by which one systematizes the expression of opinion concerning a trait. It comes in various forms, including numerical scales, semantic differential scales, Likert scales, and visual analogue scales. The purpose of a rating scale is to capture the opinions, attitudes, or behaviours of individuals in a standardized and measurable way.

Overall rating scales are a versatile and widely used method for collecting quantitative data on individual's attitudes, perceptions and behaviours. When designing and using rating scales, it's important to carefully the consider the scales characteristics to ensure that it effectively captures the information of interest in a clear and reliable manner.

10.6 SOCIO METRIC TECHNIQUE

Socio metric technique is a method used to measure social relationships and interactions within a group. Scales have an important place in social studies. It is a tool utilised in social psychology and sociology to better understand the dynamics of social groups and organizations. The technique was first developed by Jacob L. Moreno in the early 20th century and has since been used to analyse and monitor group dynamics in a variety of settings, including schools, work places, and therapeutic settings.

Socio- Metric scales are used for the quantitative study of the abstract and qualitative social phenomena. The socio Metric techniques involves collecting data from members of a group about their relationships and interactions with other members. This data can include information about who they like or dislike, who they trust or confide in, and who they prefer to work with or spend time with. This information is then used to create visual maps or diagrams of the social network within the group, allowing researchers to analyse patterns and identify social dynamics that may be impacting the group as a whole.

According to "H. H. Jenning" It is a tool to measure social distance. It is the study of social choices that people make.

Sociometry is a technique of selecting a leader from a group. This is oftenly done by using a sociogram. The sociogram is mostly used by the classroom teacher, counsellor, or psychologist to study the interpersonal relationships of groups. In the research situations it is used to study the problems of learning, motivation, discipline, and group dynamics. Socio metric techniques involves collecting data through surveys or questionnaires that ask individuals to indicate

their relationships with other members of the group. The data collected is then analysed to identify patterns and dynamics within the group. This technique can provide valuable insights into the social structure, influence, and dynamics within the group. Following process is followed in socio -metric techniques.

1. Data Collection: - The socio metric technique involves collecting data through surveys or questionnaires that ask individuals to indicate their relationships with others.
2. Analysis: - The data collected is analysed to identify patterns and dynamics within the group. This can include social hierarchies, influential individuals, and patterns of interaction.
3. Uses: - Understanding group dynamics and interactions – identifying social hierarchies and influential individuals- improving communication and group functioning.

In conclusion, the socio metric technique is a valuable tool for understanding social relationships and dynamics within a group. By collecting and analysing data on social interactions, this technique can provide insights that can be used to improve group dynamics and functioning. Whether in a school, organization, or research setting, the socio metric technique can help to identify social hierarchies, influential individuals, and patterns of interaction within a group. As a result, it is valuable tool for promoting effective communication and social cohesion.

10. 6.1 Characteristics of Socio metric Technique

There are several key characteristics of the socio metric technique that makes it a valuable tool for understanding social dynamics.

- Firstly, it is a quantitative method, allowing for the collection of numerical data that can be analysed and measured. This provides researchers with concrete information about the social relationships within a group, rather than relying on subjective or anecdotal evidence.
- Secondly, the socio metric technique is a structured and systematic method for collecting data. This helps to ensure that the information gathered is reliable and consistent, as it follows a standardized procedure for data collection and analysis. This makes it easier for researchers to compare results across different groups.
- Another characteristic of the socio metric technique is its ability to capture the complexity of social relationships. By asking participants to provide information about multiple aspects of their relationships with others, such

as liking, trust and collaboration, researchers can create a comprehensive picture of the social network within a group.

- The socio metric techniques also allow for the visualization of social networks, which can provide valuable insights into the structure and dynamics of a group. By creating visual representations of the relationships within a group, researchers can identify patterns and connections that may not be immediately apparent from the raw data.

10.6.2 Merits and Demerits of Socio Metric Techniques Merits: -

I. It has various advantages that make it a valuable tool for understanding social dynamics. It has ability to provide quantitative data about social relationships.

II. It allows researchers to analyse and measure the strength and direction of social ties within a group, providing valuable insights into the structure and dynamics of the group.

III. Socio metric techniques is a systematic and structured method for collecting data, which helps to ensure that the information gathered is reliable and consistent. This makes easier for researchers to compare results across different groups or over time, and to identify patterns and trends in social relationships.

IV. It has ability to capture the complexity of social relationships by asking participants to provide information about multiple aspects of their relationships with other. It allows for a comprehensive understanding of the social network within a group, providing insights into the various dimensions of social interaction.

V. Socio metric technique has ability to visualize social networks, which can provide valuable insights into the structure and dynamics of a group. By creating visual representations of the relationships within a group, researchers can identify patterns and connections that may not be immediately apparent from the raw data.

Demerits: -

Socio metric technique has also some limitations:

I. This technique relies on self reported data from participants, which can be subjective and prone to bias. Participants may not always accurately report their social relationships, it also leads to in accurate or incomplete information.

II. This technique is time consuming and labour-intensive to collect and analyse the data. Researchers must often rely on surveys or questionnaires to gather information from participants, and then spend time organizing and analyzing the data to create visual representations of the social network within a group.

III. This technique is limited in its ability to capture the nuances of social relationships. This technique can provide valuable insights into the strength and direction of social ties within a group, it may not fully capture the complexity of social dynamics, such as power dynamics, cliques, or informal social networks.

IV. The socio metric technique primarily relies on individual's perceptions and opinions, which can be influenced by various conscious and unconscious biases. It may not capture the objective reality of social interactions or accurately assess the true nature of relationships within the group. The results may be based on subjective judgements rather than concrete evidence.

V. The socio metric technique may raise ethical concerns, particularly regarding privacy and the potential for harm. Participants may feel uncomfortable disclosing their true opinions about others, fearing negative consequences or social repercussions. Ensuring anonymity and confidentiality becomes crucial but challenging in practice.

In conclusion, the socio metric technique is a valuable tool for understanding social relationships and dynamics within a group. By collecting and analysing data on social interactions, this technique can provide insights that can be used to improve group dynamics and functioning. It has several limitations, its subjective nature, limited scope contextual dependencies, and ethical considerations pose challenges to obtaining accurate and generalizable results. Researchers should carefully consider these demerits and employ supplementary methods to ensure comprehensive insights into social dynamics.

10.7 ATTITUDE SCALES

Meaning:

Attitude scales are crucial tools in social science research that aims to measure individual's attitudes towards specific objects, ideas, or concepts. In this tool researchers quantify and analyze subjective opinions, feelings, and beliefs. Attitude scales are psychometric measurement instruments used to assess individual's attitudes towards different entities. An attitude refers to a positive, negative, or neutral evaluation of an object, person, behaviour, or topic. These

scales quantitatively measure attitudes, providing researchers with numerical data for statistical analysis.

10.7.1 TYPES OFATTITUDE SCALES:

1) **Likert scale:** Likert scale is one of the most widely used attitude scale. It consists of a series of statements to which respondents express their level of agreement or disagreement using a pre defined ordinal rating, such as a 5-point or 7-point scale. The scores obtained can be summed or averaged to calculate and overall attitude score.

2) **Thurstone scale:** Turnstone scales involve presenting respondents with a set of statements representing different positions on an attitude continuance. Respondents indicate which statement best represents their own view. These ratings are then used to determine the attitude score based on the position of selected statements on the continuance.

3) **Semantic differential scale:** Semantic differential scales measure attitudes by using bi polar adjectives, such as "good-bad, strong-weak", or "appropriate-inappropriate, "to assess an individual's perceptions of an object or concept. Respondents indicate their position on the scale, providing a numerical value that represents their attitude.

4) **Guttman scale:** It aims to identify a hierarchical ordering of attitudes or beliefs. The respondents are presented with a series of statements that vary in intensity or specificity. Their agreement or disagreement with each statement determines their attitude level, revealing a cumulative pattern of attitudes.

10.7.2 CHARACTERISTIC OF ATTITUDE SCALES:

1) **Reliability:** Reliability refers to the consistency and stability of measurement. Attitude scales should yield similar results when administered to the same individuals under similar conditions. Reliable scales ensure that the measured attitude reflects the truth rather than random error.

2) **Validity:** Validity pertains to the accuracy and appropriateness of the scale in measuring the intended construct. Attitude scales should effectively capture the desired attitude, ensuring that the obtained scores genuinely reflect individual's opinions and beliefs.

3) **Ease of Administration:** Attitude scale should be user-friendly, enabling respondents to comprehend and respond to the items easily. Clarity in question construction, appropriate language, and clear response options contribute to the ease of administration.

4) **Sensitivity:** Attitude scales should possess sensitivity to detect even subtle differences in attitudes. A scale that fails to distinguish variations among respondents may not adequately capture the complexity of attitudes, limiting its effectiveness in judicious meaningful differences.

5) **Standardization:** Standardization ensures that attitude scales maintain consistency across different settings, researchers and population. It involves developing and following standardized procedures for scale construction, administration, and scoring.

6) **Balanced response options:** Choosing balanced response options, such as an equal no of positive and negative statements on Likert scales, prevents response bias and enhances the accuracy of measurement by challenging respondents to consider both sides of an attitude.

Attitude scales play a vital role in quantifying and analysing subjective opinions, feelings, and beliefs. They provide researchers with valuable data to understand and predict human behaviour. Likert scales, Thurston scales, Semantic differential scales, and Guttman scales are prominent examples of attitude scales that capture different aspects of attitudes.

10.7.3 MERITS AND DEMERITS OFATTITUDE SCALES

- **Merits: -**

1. Attitude scales provide a standardized way to measure and quantify attitudes, allowing for objective comparisons across individuals or groups.
2. It can provide consistent results or measurements over time, thus enhancing the reliability of research findings.
3. Attitude scales often allow for a wide range of response options, enabling participants to express their attitudes with more precision.
4. Attitude scales often numerical data that can be subjected to statistical analysis, enabling researchers to draw conclusions based on data pattern.
5. Attitude scales can be adopted to measure attitudes towards various topics such as politics, marketing, psychology and social issues.
6. Attitude scales enable comparisons between different individuals, groups, or populations, aiding in identifying differences and similarities.
7. They can be used overtime to track changes in attitudes, allowing for longitudinal studies and trend analysis.
8. These scales can be used to test theoretical frameworks and hypothesis

related to attitudes.

- **Demerits:**

1. Attitude scales often rely on brief statements or questions, which may fail to capture the complexity and nuances of attitudes in certain contexts.
2. The language used in attitude scales may not effectively capture cultural or linguistic nuances, limiting the scales applicability to diverse population.
3. Participants may display response set bias, meaning they consistently choose the same response category without considering the specific item.
4. Participants may provide responses that are socially desirable rather than their true attitudes, resulting in biased data.
5. Attitude scales often provide fixed response options, potentially overlooking unique attitudes that fall outside of those options.
6. The interpretation of attitude scale responses requires careful consideration of the scales design, context and potential biases.
7. Respondents may intentionally or unintentionally provide inaccurate or inconsistent responses, leading to biased findings.

The specific merits and demerits may vary depending on the context, design, and purpose of the attitude scale used.

10.8 CHECK YOUR PROGRESS -II

1. What is sociometric technique?
2. Define the term “sociometric matrix”.
3. Name any two types of attitude scales.
4. What is the Likert scales used for?

10.9 LET US SUM UP

Attitude scales are psychometric measurement instruments used to assess individual's attitudes towards different entities. An attitude refers to a positive, negative, or neutral evaluation of an object, person, behaviour, or topic. These scales quantitatively measure attitudes, providing researchers with numerical data for statistical analysis. Attitude scales are crucial tools in social science research that aims to measure individual's attitudes

towards specific objects, ideas, or concepts. In this tool researchers quantify and analyze subjective opinions, feelings, and beliefs. Attitude scales play a vital role in quantifying and analysing subjective opinions, feelings, and beliefs. They provide researchers with valuable data to understand and predict human behaviour. Likert scales, Thurston scales, Semantic differential scales, and Guttman scales are prominent examples of attitude scales that capture different aspects of attitudes.

10.10 KEYWORDS/ Glossary

Observation – A direct method of collecting data by watching behavior or events in their natural setting without interference.

Objectivity – Recording facts without personal bias during observation.

Observer Bias – A distortion in data caused by the observer's personal beliefs or expectations.

Rating Scale – A tool used to assign numerical or verbal values to traits, behaviors, or performance for comparison or evaluation.

Likert Scale – A common type of rating scale measuring the degree of agreement or disagreement with statements.

Item Construction – The process of designing questions or statements for use in rating or attitude scales.

Reliability – The consistency of a measurement tool over time or across raters.

Validity – The degree to which a tool accurately measures what it is intended to measure.

10.11. Self-Assessment Questions

1. Why observation method is important in the field of research?
2. Which type of behaviour is studied under observation method?
3. Explain any one characteristics of observation you likes most?
4. Discuss any one disadvantage of observation and suggest some remedy to overcome it.
5. What is the purpose of rating scale?
6. Elaborate different types of scale?
7. How scoring procedure is done in rating scales?
8. Discuss any three merits of rating scales?
9. Define Socio-metric technique?

10. Explain any one characteristics of socio-metric technique?
11. Can you justify merits of socio metric technique?
12. Can you explain attitude scale and its significance in social science research?
13. How Liker scale is different from semantic differential scale?
14. What do you understand by validity of scale?

10.12. SUGGESTED READINGS

- **Naturalistic Inquiry**" by Yvonna S. Lincoln and Egon G. Guba.
- **Ethnography and Education**" edited by Geoffrey Walford.
- **Qualitative Classroom Observation**: A Guide for Educators" by Eleanor K. Smith.
- **Qualitative Research and Case Study Applications in Education**" by Sharan B. Merriam and Robert E. Stake.
- **Rating Scale Development: 3rd Edition" by Robert F. De Vellis**. This book offers a detailed guide to the process of developing and validating rating scales, emphasizing principles and practical steps involved in scale construction and evaluation.
- **Measurement Theory and Practice: The World Through Quantification" by David J. Hand**. While broader in scope, this book discusses measurement theory, including the development and application of rating scales in various research domains.
- **The Development of Children's Concepts of Causality" by Richard E. Clark**. This book examines the development of children's concepts of causality,
- **Sociometry, Experimental Method and the Science of Society" by Jacob L. Moreno** , This classic work by Moreno, who pioneered sociometry, explores the theory and applications of sociometric techniques.
- **Handbook of Social Network Analysis" edited by Peter J. Carrington, John Scott, and Stanley Wasserman** - This comprehensive handbook covers various methods in social network analysis, including sociometric techniques.
- **Sociometric Methods" by Leo Katz** , Katz's book provides an in-depth examination of different sociometric methods and their applications in social science research.

- **Measurement of Attitudes" by George A. Miller, Eugene Galanter, and Karl H. Pribram**, This classic text provides an overview of various methods for measuring attitudes, including the development and validation of attitude scales.
- **Attitude Measurement" by Herbert H. Clark and Pauline V. Young**, This book offers a comprehensive exploration of attitude measurement techniques, focusing on the construction and evaluation of attitude scales.
- **Attitudes and Attitude Change" by Gordon H. Bower**, While primarily focused on theories of attitudes and attitude change, this book also covers measurement techniques and scales used in attitude research.
- **Measuring Attitudes Cross-Nationally. Lessons from the European Social Survey" edited by Roger Jowell, Caroline Roberts, Rory Fitzgerald, and Gillian Eva**. This book discusses the challenges and methodologies involved in measuring attitudes across different countries, emphasizing the use of attitude scales in cross-national survey.

CONSTRUCTION OF SACLES

UNIT: III	LESSON:11

STRUCTURE

11.1 INTRODUCTION

In the field of educational research and assessment, the measurement of abstract constructs like attitudes, perceptions, and professional effectiveness plays a vital role in informing policy and practice. Scale construction techniques are essential tools that enable researchers to quantify such abstract variables with reliability and validity. These techniques involve the systematic development of a set of items or statements arranged in a progressive or continuous order, aimed at gauging individuals' responses toward specific constructs such as teacher effectiveness, motivation, or satisfaction.

Scaling is more than just assigning numbers—it is a rigorous process that transforms qualitative data into a quantitative framework, facilitating analysis, comparison, and interpretation. This process is widely used across disciplines such as psychology, social sciences, and educational research to ensure objectivity and standardization in assessment.

The present work illustrates the application of these techniques in constructing a standardized Teacher Effectiveness Scale, developed by Prof. M. M. Mattoo during his doctoral research. The scale was designed to evaluate various dimensions of teaching effectiveness, including planning, classroom management, subject knowledge, interpersonal skills, and digital competence. The development process followed a scientific sequence of steps such as item generation, expert validation, pilot testing, item analysis, and reliability and validity testing, ensuring the tool's credibility and applicability.

11.2 OBJECTIVES

Students after reading this topic will be able to:

- ❖ Know the steps for construction of scales.
- ❖ Know how to standardize a scale.

11.3 CONSTRUCTION OF SCALES

Techniques used to create a progressive set of items or categories (in a continuous spectrum) to gauge a person's attitude toward a particular event or object are referred to as scale construction techniques. The practice of giving variables or objects numerical numbers to indicate their relative positions or magnitudes is known as scale construction. In many domains, such as the social sciences, market research, psychology, and data analysis, scaling techniques are frequently used to convert qualitative or ordinal data into quantitative data that is easier to compare and evaluate.

Constructing tool scales involves several steps which are as following:

1. Define purpose and construct: - Clearly define the purpose of the tool scale and construct it intends to measure. Whether it's assessing skills, attitudes or behaviours, a precise definition is crucial.

2. Literature review: - Conduct a thorough literature review to identify existing scales or tools related to the construct. Understand their strengths, weaknesses, and any gaps that your scale can fill.
3. Item generation: - Generate a pool of items /questions related to the construct. These should cover a range of difficulty levels and aspects of the construct. Ensure clarity and relevance.
4. Expert review: - Having experts in the field review the items for content validity. This step ensures that the items accurately measure the intended construct.
5. Pilot testing: - Administer the initial set of items to a small sample to identify any issues, such as ambiguous wording or cultural biases. Use the feedback to refine and improve the items.
6. Item Analysis: - Conduct statistical analyses on the pilot test data to identify poorly performing items. Remove or a revise item that do not

contribute to the reliability and validity of the scale.

7. Standardization: - Administer the finalised scaled to a representative sample of the target population. Collect data on a large enough scale to establish norms and standardize the tool.
8. Reliability testing: - Assess the reliability of the scale through methods like test – retest reliability or internal consistency (e.g. Cronbach's alpha). This ensures consistency in measurement over time or across items.
9. Norms and scoring: - Establish norms for interpreting scores and develop a clear scoring system. This step ensures that results can be meaningfully interpreted and compared across individuals or groups.
10. Validity testing: - Evaluate the validity of the scale by examining its ability to measure what it intends to measure. This can include content validity, criterion – related validity, and construct validity.
11. Documentation: - Provide detailed documentation for users, including instructions for administration, scoring procedures, and guidelines for result interpretation.
12. Select measurement tools: - Choose appropriate measurement tools such as rubrics, checklists, or rating scales that align with the identified criteria. Ensure these tools are suitable for the type of assessments.
13. Continuous improvement: - Establish a feedback loop for continuous improvement. Regularly review the tool scales based on user feedback, technological advancement, or changes in the field. Regularly evaluate and update the tool as needed to maintain its relevance and effectiveness over time. In education tool scales play a crucial role in promoting transparency, fairness and consistency in evaluating students' performance and progress.

    Constructing standardized tool scales requires a balance between precision and practicality and ongoing refinement based on feedback and research is crucial.

    The author (Prof M.M.Mattoo) has himself constructed a standardized tool on (Teacher Effectiveness Scale) during his Ph.D programme, whose step by step detail has been presented below.

11.4 CHECK YOUR PROGRESS -I

10.9.1.1 What is the main purpose of using a scale in research?

10.9.1.2 How do scales help in measuring abstract concepts?

10.9.1.3 What is the first step in constructing a scale?

10.9.1.4 How is the validity of a scale ensured?

11.5 PRELIMINARY DRAFT OF TEACHER FFECTIVENESS SCALE

For the development of the tool, a survey of text books, existing teacher effectiveness scales, print media, research papers on teacher effectiveness and related literature was done. On the basis of this survey, the investigator formulated a variety of statements. Thus, a preliminary draft of 101 items was prepared. This draft consists of 101 items which are based on following six dimensions.

1. **Preparation and Planning for Teaching**. Ability of the teacher in preparing, planning and organizing teaching material and formation of Objectives before making any plan. A fundamental procedure of constructing the lesson is to achieve the course objectives. This process allows teachers to evaluate their own and student's knowledge with regard to the content to be taught (Reed & Michaud, (2010). Explanation involves the presentation of the subject matter in a simplified form before the learners and making it understandable. It involves the appropriate use of teaching aids. Use of media helps in learning process to be more effective. This dimension includes the items related to planning of whole teaching material beforehand.
2. **Classroom Management.** This dimension includes an integration of factors related to the organization and management of a class with the aim of creating safe and well-established learning environment. Ability to maintain student's event and sympathetic behaviour towards students. Modeling positive behaviour, maintain discipline, creating safe environment and democratic organization.
3. **Knowledge of Subject Matter. Subject matter knowledge** has been considered the heart of the **teacher**'s practice. This dimension includes

understanding of facts, concepts, and practices of a scientific discipline that is a prerequisite to the development of pedagogical content knowledge.

4. **Teacher Characteristics** This area includes statements pertaining to the personality make-up and its behavioral manifestations that have their own level of acceptability or unacceptability in the teaching profession. Ability to arouse a perceptive and seeking active participation of students constitute essential demanding characteristics of an effective teacher.
5. **Inter-Personal Relations.** This dimension has three sub categories like**,**

a) Team Spirit. Team spirit is **a frame of mind to work in a team by combining efforts to achieve a mutual goal.** It is the moral value one holds while working in a group

b) Recognition and Respect. This dimension include items which highlight, whether the members in the organization gain true respect and recognition from the administrator and whether they reinforce each other in different tasks.

c) Communication Flow. This dimension includes items which measures what kind of communication exists between teachers and students.

6. **Digital Competence.** This dimension is related to extent to what, a teacher is in a position to use computer, Laptop and other related devices and other related software and application involved in teaching learning process. Dimension include items related to teachers which demand broad knowledge of ICT along with all hardware devices required there in teaching profession, which could enhance the effectiveness of teachers through online and offline mode. This dimension also aimed at to develop the ability of teachers to apply and transfer all their knowledge, strategies, skills, and attitudes regarding learning and knowledge through technologies to real and concrete situations in their career, with the aim of (a) facilitating student learning and the acquisition of digital competence; (b) implementing processes of improvement and innovation in teaching in accordance with the needs of the digital era; and (c) contributing to their professional development in accordance with the processes of change occurring in society and in educational centers.

SCRUTINYAND CRITIQUE

A total of 101 items were written with the following breakdown:

Preparation and planning for teaching (16 items), Classroom Management (15

items), Knowledge of subject matter (18 items), (Professional competence (10 items), Teacher Characteristics (14 items), Interpersonal Relations (15 item) and Digital Competence (23 items).After proper screening, careful discussions and cautious deliberations with subjects experts, researchers, measurement experts and knowledgeable persons in the field of education, weak and poor items were either modified, improved or dropped. On the basis of their judgment and reasoning only 66 items out of 101 items of all the six dimensions were retained for initial try out.

Table No: 1

Sr.No	Dimensions	Items	No. of Items	Total No of Items	Total
A	Preparation and planning for teaching	Positive		07	12
		Negative		05	
B	Classroom Management	Positive		06	10
		Negative		04	
C	Knowledge of subject matter	Positive		08	11
		Negative		03	
D	Teacher characteristics	Positive		07	12
		Negative		05	
E	Inter- personal relations	Positive		04	11
		Negative		07	
F	Digital Competence	Positive		06	10
		Negative		04	
					66
		Total	66		

PRE-TRY-OUT OF SCALE

This Scale was distributed to a small sample of 12 twelve secondary school teachers. After proper instructions the teachers were asked to go through to each of the items and provide feedback in connection with whether, it is relevant to measure what it is supposed to measure. After slight changes in some items, scale was ready for try out.

VALIDITY OF THE SCALE

When the items of teacher effectiveness scale were written as per the blueprint, after revision, the tool was given to senior secondary school teachers, teacher educators, research scholar, research experts and psychologists. On the basis of suggestions, modifications and evaluation by experts and judges confirm its face and content validity. The process of item analysis also ensures item validity of the scale

TRY OUT

The initial form of Teacher effectiveness Scale (TES) which consisted of 66 items were administered on a sample of 119 subjects. These subjects included secondary school teachers from different secondary schools of Jammu and Kashmir.

SCORING

The scoring was done by following the likert's method,(in case of positive item) Strongly Agree (5), Agree (4), Undecided (3), Disagree (2) and Strongly Disagree (1). The scoring was reserved for the statements that were negative.

TABLE No. 2 Scoring Procedure

Type of items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Positive	5	4	3	2	1
Negative	1	2	3	4	5

TRYOUT OF THE TEACHER EFFECTIVENESS SCALE

The scale was administered on 726 secondary school teacher (Government/Private, Rural/Urban. Including male and female teachers) of Jammu and Kashmir (UT) who were selected randomly by the researcher.

TABLE No.3 Showing Item Analysis Results for Discrimination Index.

Item No	r	level	Remark	Item No	r	Level	Remark
1.	0.52		Selected	34	0.84		Selected
2.	0.85		Selected	35	0.84		Selected
3.	0.95		Selected	36	0.86		Selected
4.	0.74		Selected	37	0.8		Selected
5.	0.46		Selected	38	0.85		Selected
6.	0.97		Selected	39	0.9		Selected
7.	0.76		Selected	40	0.88		Selected
8.	0.91		Selected	41	0.97		Selected
9.	0.70		Selected	42	0.87		Selected
10.	0.69		Selected	43	0.79		Selected
11.	0.84		Selected	44	0.92		Selected

12.	0.98		Selected	45	0.9		Selected
13.	0.8		Selected	46	0.86		Selected
14.	0.82		Selected	47	0.93		Selected
15.	0.87		Selected	48	0.97		Selected
16.	0.9		Selected	49	0.99		Selected
17.	0.82		Selected	50	0.87		Selected
18.	0.83		Selected	51	0.85		Selected
19.	0.94		Selected	52	0.87		Selected
20.	0.86		Selected	53	0.92		Selected
21.	0.84		Selected	54	0.92		Selected
22.	0.84		Selected	55	0.82		Selected
23.	0.79		Selected	56	0.93		Selected
24.	0.71		Selected	57	0.92		Selected
25.	0.93		Selected	58	0.93		Selected
26.	0.89		Selected	59	0.87		Selected
27.	0.92		Selected	60	0.0		**Rejected**
28.	0.76		Selected	61	0.82		Selected
29.	0.9		Selected	62	0.87		Selected
30.	0.92		Selected	63	0.98		Selected
31.	0.88		Selected	64	0.84		Selected
32	0.81		Selected	65	0.87		Selected
33	0.77		Selected	66	0.66		Selected

This clearly shows that after calculating discrimination index 65 items were selected and 01 item was rejected from 66 items in the Teacher Effectiveness Scale (TES).

Statistical Results are given in table 4

TABLE No. 4

Total Items	Sample	Mean	S.D	Q1	Q3	Correlation
65	726	262	22	249	275	Spearman Brown 0.81

NORMS

Z-score norms have been prepared for the conversion of raw score into standard scores (Table No 6). Norms for interpretation of the level of Teacher Effectiveness Scale has been given in the table 5.

TABLE No. 5

Mean: 262 **Standard Deviation: 22** **Numbers: 726**

Raw Score	Z-Score	t-Score	Raw Score	Z-Score	t-Score	Raw Score	Z-Score	t-Score	Raw Score	Z-Score	t-Score	Raw Score	Z-Score	t-Score
182	-3.63	13.63	234	-1.27	37.27	255	-0.31	46.81	276	0.63	56.36	297	1.59	65.9
205	-2.59	24.09	235	-1.22	37.72	256	-0.27	47.27	277	0.68	56.81	298	1.63	66.36
210	-2.26	26.36	236	-1.18	38.18	257	-0.22	47.72	278	0.72	57.27	299	1.68	66.81
212	-2.27	27.27	237	-1.13	38.63	258	-0.18	48.18	279	0.77	57.72	300	1.72	67.27
213	-2.22	27.27	238	-1.09	39.09	259	-0.13	48.63	280	0.81	58.18	301	1.77	67.72

214	-2.18	28.18	239	-1.04	39.54	260	-0.09	49.09	281	0.86	58.63	302	1.81	68.18
216	-2.09	29.09	240	-1	40	261	0.04	49.54	282	0.90	59.09	303	1.86	68.63
218	-2	30	241	-0.95	40.45	262	0.0	50	283	0.95	59.54	304	1.90	69.09
219	-1.95	30.45	242	-0.90	40.9	263	0.04	50.45	284	1	60	305	1.95	69.54
220	-1.90	30.9	243	-0.86	41.36	264	0.09	50.9	285	1.04	60.45	306	2	70
221	-1.86	31.36	244	-0.81	41.81	265	0.13	51.36	286	1.09	60.9	307	2.04	70.45
222	-1.81	31.81	245	-0.77	42.27	266	0.18	51.81	287	1.13	61.36	308	2.09	70.9
225	-1.68	33.18	246	-0.72	42.72	267	0.22	52.27	288	1.18	61.81	309	2.13	71.36
226	-1.63	33.63	247	-0.68	43.18	268	0.27	52.72	289	1.22	62.27	311	2.22	72.27
227	-1.59	34.09	248	-0.63	43.63	269	0.31	53.18	290	1.27	62.72	317	2.50	75
228	-1.54	34.54	249	-0.59	44.09	270	0.36	53.63	291	1.31	63.18	318	2.54	75.45
229	-1.50	35	250	-0.54	44.54	271	0.40	54.09	292	1.36	63.63	323	2.77	77.72
230	-1.45	35.45	251	-0.50	45	272	0.45	54.54	293	1.40	64.09			
231	-1.40	35.9	252	-0.45	45.45	273	0.50	55	294	1.45	64.54			
232	-1.36	36.36	253	-0.40	45.9	274	0.54	55.45	295	1.50	65			

233	-1.31	36.81	254	-0.36	46.36	275	0.59	55.9	296	1.54	65.45			

NORMS FOR INTERPRETATION OF THE LEVEL OF TEACHER EFFECTIVENESS SCALE

TABLE No 6.

Sr.No	Range of z-Score	Raw Score	Grade	Level of Teacher Effectiveness
1	**+2.01 and Above**	**307 and Above**	**A**	**Extremely High**
2	+1.26 to 2.00	290 To 306	B	High
3	+0.51 to +1.25	274 To 289	C	Above Average
4	**-0.50 to +0.50**	**251 To 273**	**D**	**Average**
5	-0.51 to -1.25	235 To 250	E	Below Average
6	-1.26 to -2.00	218 To 234	F	Low
7	**-2.01 and Below**	**217 and Below**	**G**	**Extremely Low**

11.6 CHECK YOUR PROGRESS 2

1) How would you structure a questionnaire to gather feedback on student satisfaction with online learning experiences?
2) Could you outline the key areas where resource allocation impacts student outcomes within an educational institution?
3) In what ways might an opinionnaire be beneficial in assessing teacher perceptions of a new teaching methodology or curriculum change?
4) What are the advantages of conducting interviews with parents to understand their perspectives on the effectiveness of a school's disciplinary policies?
5) How does the use of an information schedule aid researchers in collecting factual data regarding the allocation of technology resources in educational

institutions?

6) Differentiate between the use of interviews and questionnaires in educational research, highlighting when each method might be more appropriate?
7) What is an observational study?
8) Write in brief the steps that need to be followed while constructing a questionnaire?
9) Discuss in detail the steps for standardization of a research tool?
10) How can sociometric technique be used as a research tool?

11.7 LET US SUM UP

Scale Construction refers to the creation of empirical measures for theoretical constructs. In many domains, such as the social sciences, market research, psychology, and data analysis, scaling techniques are frequently used to convert qualitative or ordinal data into quantitative data that is easier to compare and evaluate. These measures usually consist of several items. The purpose of scale construction is to design a questionnaire that provides a quantitative measurement of an abstract theoretical variable. Good scales possess both validity and reliability. A scale has validity if it properly represents the theoretical construct it is meant to measure. A scale has reliability if repeated measurements under the same circumstances tend to produce the same results. These two concepts are very important to scale construction.

11. 8 KEYWORDS

Scale Construction – The process of developing a systematic set of items to measure a specific construct.

Teacher Effectiveness – A multidimensional construct reflecting a teacher's ability to facilitate learning and student development.

Standardization – Establishing norms and consistent procedures for administering and scoring a scale.

Item Generation – The creation of statements or questions designed to measure aspects of a construct.

Content Validity – The extent to which a scale's items represent the entire domain of the construct.

Pilot Testing – Preliminary testing of a tool on a small sample to detect flaws or areas of improvement.

Item Analysis – Statistical evaluation of each item to determine its quality and contribution to the overall scale.

Reliability – The consistency and stability of a measurement tool over time or across items.

11.9. Self-Assessment Questions

1. What is the main purpose of the Teacher Effectiveness scale?
2. List any two key domains included in the draft scale.
3. How can the preliminary draft be useful for teacher development?
3 What feedback would you provide to improve this draft scale?

11.10 SUGGESTED READINGS

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- **Burroughs, N. et al. (2019).** A Review of the Literature on Teacher Effectiveness and Student Outcomes. In: Teaching for Excellence and Equity. IEA Research for Education, vol 6. Springer, Cham. https://doi.org/10.1007/978-3-030-16151-4
- **Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research**" by John W. Creswell and Creswell J.David
- **"Educational Research: An Introduction**" by Meredith D. Gall, Joyce P. Gall, and Walter R. Borg
- **"Educational Theory: An Introduction**" by David Turner and Roy Lowe
- **Carlo Magno and** Josefina Otarra Sembrano **(2008).** The Role of Teacher Efficacy and Characteristics on Teaching Effectiveness, Performance, and Use of Learner-Centered Practices
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- **Shubha Chandra, Dr. Chandrashe, Chinmaya Prakash (2020).** Measuring teacher effectiveness development of a shorter version of teacher effectiveness scale (TES). International Journal of Education, Modern Management, Applied Science & Social Science (IJEMMASSS) Volume 02.
- **Xumei Fan (2022).** Teachers' perspectives on the evaluation of teacher effectiveness: A focus on student learning objectives. Internal journal of Teaching and Teacher Education. Vol. 110.

REARCH REPORT: CONCEPT AND PURPOSE OF

UNIT: IV **Lesson No:12**

REPORT WRITING

STRUCTURE

12.1 INTRODUCTION

As we know that the research is the systematic investigations of the natural, material, or the existing conditions of the society in which we live. To get the additional information to reach the new conclusions, for which the research report writing skill is important. So the research report wring is the systematic write up on the finding of the study which includes methodology, discussions conclusions

etc. the research report provides us the complete information regarding the investigated problems. Without the research report the research is incomplete.

12.2 OBJECTIVES

When you go through this chapter you will be able to answer the following questions

- What is the concept and purpose of research writing?
- Write a short note on research report?
- What is the various steps of research report?

12.3 RESEARCH REPORT: CONCEPT AND PURPOSE OF REPORT WRITING

Research report is considered a major component of the research study for the research task remains incomplete till the report has been presented and/or written as a matter of fact even the most brilliant hypothesis, highly well designed and conducted research study, and the most striking generalizations and findings are of little value unless they effectively communicated to others. The purpose of research is not well served unless the findings are made known to others. Research results must invariably enter the general store of knowledge. All this explains the significance of writing research report. There are people who do not consider writing of report as an integral part of the research process. But the general opinion in of treating the presentation of research results or the writing of report as part and parcel of the research project. Writing of report is the last step in the research study and requires a set of skills somewhat different from those called for in respect of the earlier stages of research. This task should be accomplished by the researcher with utmost care; he may seek the assistance and guidance of experts for the purpose.

12.4 DIFFERENT STEPS IN WRITING REPORT

Research reports are the product of slow, painstaking, accurate inductive work. The usual steps involved in writing report are:

a) Logical analysis of the subject-matter;

b) Preparation of the final outline;

c) Preparation of a rough draft;

d) Rewriting and polishing.

e) Preparation of the final bibliography;

f) Writing the final draft.

Though all these steps are self-explanatory, yet a brief mention of each one of

these will be appropriate for better understanding.

a. **Logical analysis of subject matter:** It is the first step which is primarily concerned with development of a subject. There are two ways in which to develop a subject a. Logically and b. Chronologically. The logical development is made on the basis of mental connections and associations between the one thing and another by means of analysis. Logical treatment often consists in developing the material form the simple possible to the most complex structures. Chronological development is based on a connection or sequence in time or occurrence. The direction for doing or making something usually follow the chronological order.

b. **Preparation of the final outcome:** Outlines are the framework upon which long written works are constructed. They are an aid to the logical organisation of the material and a reminder of the pints to be stressed in the report.

c. **Preparation of the rough draft:** This follows the logical analysis of the subject and the preparation of the final outline. Such a step is of utmost importance for the researcher now sits to write down what he has done in the context of his research study. He will write down the procedure adopted by him in collecting the material for his study along with various limitations faced by him, the technique of analysis adopted by him, the broad findings and generalizations and the various suggestions he wants to offer regarding the problem concerned.

d. **Rewriting and polishing of the rough draft:** Usually this step requires more time than the writing of the rough draft. The careful revision makes the difference between a mediocre and a good piece of writing. While rewriting and polishing, one should check the report for weaknesses in logical development or presentation. The researcher should also i. see whether or not the material, as it is presented, has unity and cohesion. ii. the report stand upright and firm and exhibit a definite pattern. In addition the researcher should give due attention to the fact that in his rough draft he has been consistent or not. He should check the mechanics of writing --- grammar, spelling and usage.

e. **Preparation of the final bibliography:** Next in order comes the task of the preparation of the final bibliography. The bibliography, which is generally appended to the research report, is a list of books in some way pertinent to the research which has been done. It should contain all those works which the researcher has consulted. The bibliography should be arranged Alphabetically and may be divided into two parts; the first part may contain

the names of books and pamphlets, and the second part may contain the names of magazines and newspaper articles. Generally, this pattern of bibliography is considered convenient and satisfactory from the print of view of reader, though it is not the only the way of presenting bibliography. The entries in bibliography should be made adopting the following order:

For books and pamphlets the order may be as under:

i. Name of author, last name first.

ii. Title, underlined to indicate italics.

iii. Publisher, place, and date of publication.

iv. Number of volumes.

Example: Kothari, C.R. Quantitative Techniques, Vikas Publishing House Pvt. Ltd., New Delhi, 1978

For magazines and newspapers the order may be as under:

i. Name of the author, last name first.

ii. Title of article, in quotation marks.

iii. Name of periodical, underlined to indicate italics.

iv. The volume number and issue number.

v. The date of the issue.

vi. The pagination (page or page range as required).

Example: Robert V. Roosa, "Coping with Short-term International Money flows", The Banker, London September, 1971,p.995.

The above examples are just the samples for bibliography entries and may be used, but one should also remember that they are not the only acceptable forms. The only thing important is that, whatever method one selects, it must remain consistent.

f. Writing of the final draft: This constitutes the last step. The final draft should be written in a concise and objective style and in simple language, avoiding vague expressions such as "it seems", "there may be " , and the like ones While writing the final draft, the researcher must avoid abstract Terminology and technical jargon. Illustrations and examples based on common experiences must be incorporated in the final draft as they happen to be most effective in communicating the research findings to others. A research report should not be dull, but must enthuse people and maintain interest and must show

originality. It must be remembered that every report should be an attempt to solve some intellectual problem and must contribute to the solution of a problem and must add to the knowledge of both the researcher and the reader.

12.5 CHECK YOUR PROGRESS-I

1. What are the main objectives of report writing?
2. How does report writing help in decision-making?
3. Why is objectivity important in report writing?
4. What is the first step in writing a report?

12.6 PROBLEMS OF PREPARING A REPORT

To an ordinary person, report writing is not a difficult job. It appears that it only involves gathering of facts and writing down the report in a serial order. However, the actual writing of report is not so easy. It may face several problems, of which the most important are as follows:

1. Problem of language: The most important problem concerning report writing is the problem of language. If the report adopts simple and local dialects, its level is considered low. Again, the technical matters cannot be easily communicated through simple language. On the other hand, if too many technical and scientific terms are used in writing the report, it cannot be popular since the level of language of most of the readers may not be very high to understand the language of the report. Therefore, it is difficult to choose a language which may be simple and easy and yet convey the technical details properly. An important point about the language of report is that it should not include any term which conveys two or more meanings, since it will confuse the readers. Therefore, the solution of the problem of the language of the report requires a lot of patience and skill.
2. Problem of technical terms: Most of the physical sciences have precise and clearly defined technical terms. On the other hand, sociology neither has a sufficient number of technical terms nor all the terms used in it have been precisely and clearly defined. Therefore, report writing has to face the dual problem of lack of technical terms and lack of definition of the terms used.
3. Problem of objectivity: Objectivity is the basic element in every science. Preparation of report is a scientific job. Therefore, it should be sufficiently objective. It practice, however, it is often difficult to maintain sufficient objectivity. This is particularly due to the nature of social survey. The physical

sciences involve material subject matter. In social survey, however, the surveyor is himself a member of the subject of study. He has some preconceptions and prejudices about social matters. Therefore, it is difficult to him to be absolutely objective. He may be emotionally attached to certain persons or groups, so that he cannot objectively evaluate their merits and demerits. Due to all these reasons it is difficult to maintain objectivity in a a survey report.

4. The problem of publication of facts and quasi-truths. Some of the facts gathered by a social survey may be such which are true but their publication may be harmful to the interests or prestige of a particular person or group. In such a situation the reporter has to face the dilemma to publish or not to publish the facts. The publication of quasi-truths is even more difficult. These truths have not been completely verified. Therefore, it is difficult to decide whether they may find a place in the report or not. Their inclusion may reduce the validity of the report, while their negation may make the report inadequate for the guidance of future investigators, in that directions.

12.7 PRECAUTIONS IN REPORT WRITING

From the above mentioned discussion, it is clear that several precautions must be observed in writing the report of a survey. Of these some more important are as follows:

1. There should be no haste in writing report. The reporter should have patience in his job.
2. The language of the report should be generally according to the level of the expected readers.
3. The presentation of the report should be logically connected and systematic.
4. As far as possible the technical terms used should also be explained in simple language.
5. Comments and noted should be inserted in brief, wherever required.
6. Tables, charts, graphs, maps and photographs should be used wherever required and their several number should be clearly mentioned below them.
7. Detailed and systematic reference of the worlds consulted in report writing, should be given in footnotes and elsewhere. A complete reference includes the surname, the name of the author, the title of the work , the place of publication; the name of the publisher , the year of publishing and the page number. For example: Sharma, Ram Nath, Principles of Sociology, Bombay, Asia Publishing House, 1964, p.15.

12.8 CHARACTERISTICS OF A GOOD REPORT

This article throws light upon the top eleven characteristics of a good report. The characteristics are: 1. Simplicity 2. Clarity 3. Brevity 4. Positivity 5. Punctuation 6. Approach 7. Readability 8. Accuracy 9. Logical Sequence 10. Proper Form 11. Presentation.

1. Simplicity: The language shall be as simple as possible so that a report is easily understandable. Jargons and technical words should be avoided. Even in a technical report there shall be restricted use of technical terms if it has to be presented to laymen.

2. Clarity: The language shall be lucid and straight, clearly expressing what is intended to be expressed. For that the report has to be written in correct form and following correct steps.

3. Brevity: A report shall not be unnecessarily long so that the patience of the reader is not lost and there is no confusion of ideas. But, at the same time, a report must be complete. A report is not an essay.

4. Positivity: As far as possible positive statements should be made instead of negative ones. For example, it is better to say what should be done and not what should not be done.

5. Punctuation: Punctuations have to be carefully and correctly used otherwise the meaning of sentences may be misunderstood or misrepresented.

6. Approach: There are two types of approaches: (a) Person—When a report is written based on personal enquiry or observations, the approach shall be personal and the sentences shall be in the first person and in direct speech, (b) Impersonal—When a report is prepared as a source of information and when it is merely factual (e.g. a report on a meeting), the approach shall be impersonal and the sentences shall be in the third person and in indirect speech.

7. Readability: The keynote of a report is readability. The style of presentation and the diction (use of words) shall be such that the readers find it attractive and he is compelled to read the report from the beginning to the end.' Then only a report serves its purpose. A report on the same subject matter can be written differently for different classes of readers.

8. Accuracy: A report shall be accurate when facts are stated in it. It shall not be biased with personal feelings of the writer.

9. Logical Sequence: The points in a report shall be arranged with a logical sequence, step by step and not in a haphazard manner. A planning is necessary

before a report is prepared.

10. Proper Form: A report must be in the proper form. Sometimes there are statutory forms to follow.

11. Presentation: A report needs an attractive presentation. It depends on the quality of typing or printing as well as quality of paper used. Big companies make very attractive and colourful Annual Reports.

12.9 NEED OF RESEARCH REPORT

1. To report the research in full.
2. To subject its results its results to criticism and verification.
3. To make the research work communicable to the general public for the practical use.
4. To encourage other persons to take up some problems for further investigation.
5. To suggest some new problems for further studies as the research report reviews the related studies and discusses the result of the study.
6. To give shape and form to the investigation and solidify it.
7. To provide a clear picture of research method, sample and techniques used in conducting the research work.
8. To popularize the new contributions in the discipline.

12.10 GENERAL FORMAT OF THE RESEARCH REPORT

Several style manuals guidance to the researcher don't the specific rules on style and format to be followed in reporting findings of his research. Some universities, research organizations or journal boards have established their own format to which their dissertations or research papers must conform. However, all formats are somewhat similar to the following outline:

Preliminary Section

1. Title page
2. Preface, including acknowledgement (if necessary)
3. Table of contents
4. List of tables (if any)
5. List of figures, maps or illustrations (if any).

Body of the Report or Text

1. Introduction

i. Statement of the problem

ii. Analysis of previous research
iii. Relation of present problem to theoretical position of the previous research.
iv. Significance of the problem
v. Delimitation of the study
vi. Assumptions underlying hypotheses
vii. Statement of hypotheses viii.
Definition of important terms.

2. Design of the study

i. Procedures employed
ii. Sources of data
iii. Data gathering instruments
iv. Sampling and methods of gathering data.

3. Analysis and interpretation of the data

I. Text
ii. Tables (if any, are usually included into the text)
iii. Figures (if any, are usually included into the text)

4. Summary and conclusions

i. Brief restatement of problem and procedures
ii. Principal findings and conclusions with their practical implications (if any)
iii. Suggestions for further research.

5. Reference Section

1. Bibliography
ii. Appendix
iii. Index (if any)

12.11 CHECK YOUR PROGRESS-II

True/False

1. A research report is necessary to communicate research findings to others.
2. A good research report should be clear, concise, and objective.
3. Research reports are only useful for the researcher and not for external stakeholder.
4. A research report can include personal opinions and assumptions without evidence.

12.12 LET US SUM UP

A research report is vital for communicating study findings, methodologies, and conclusions, completing the research process. It aims to inform decision-making, enable verification, and inspire further studies. The writing involves logical analysis, outlining, drafting, polishing, bibliography preparation, and finalizing a clear, objective report. Challenges include language balance, objectivity, and handling sensitive data. Precautions like using reader-friendly language, logical structure, and visuals ensure quality. A good report is simple, clear, concise, and logically presented, advancing knowledge effectively.

12.13: KEYWORDS

- **Research Report**: A systematic write-up presenting a study's findings, methodology, and conclusions.
- **Report Writing**: The process of documenting research results clearly and logically for communication.
- **Methodology:** The procedures and techniques used to conduct the research.
- **Findings:** The results or outcomes derived from the research study.
- **Conclusions:** The final inferences drawn from the research findings.
- **Logical Analysis**: Organizing the subject matter logically or chronologically for clarity.
- **Bibliography**: A list of all sources consulted, formatted consistently.
- **Objectivity**: Maintaining unbiased, factual reporting without personal influence.
- **Simplicity**: Using clear, understandable language to ensure accessibility.
- **Clarity**: Expressing ideas lucidly to avoid confusion.

12.14 SELF ASSESSMENT QUESTIONS

Q1. What is the concept and purpose of research report?

Q2. What are the various steps of research report?

Q3. Write four major differences between measurement and evaluation.

Q4. Define what a research report is.

Q5 Discuss how it provides evidence and supports decision-making.

Q6. Explain how it helps in preserving research for future reference.

Q7. Describe the key characteristics of a good research report.

12.15 SUGGESTED READINGS

- S.K. Mangal, Shubhra Mangal.(2019). Research Methodology in Behavioural Sciences. PHI Learning Pvt. Ltd., Delhi

- C.R.Kothari, Gaurav Garg. (2022). Research Methodology: Methods and Techniques. New Age International Pub.lishers. New Delhi
- Dr.Radha Mohan. (2017). Research Methods in Education. Neelkamal Publications Pvt. Ltd., Hyderabad.
- Koul, Lokesh, (1997) : Methdology of Educational Research, Vikas Publishing House Pvt. Ltd., pp. 88-108, New Delhi
- Singh, A.K. (1996) : Tests, Measurements and Research Methods in Behavioural Sciences. Tata McGraw-Hill Publishing Company Ltd. Pp. 368- 367, New Delhi
- Sukhia, S.P. Mehrotra, P.V. and Mehrotra, R.N. (1980) : Elements of Educational Research, Allied Publishers Pvt. Ltd, pp. 101-127, New Delhi

MECHANICS OF WRITING A RESEARCH REPORT

Unit: III **Lesson No.: 13**

Structure

13.1 INTRODUCTION

There are very definite and set rules which should be followed in the actual preparation of the research report or paper. Once the techniques are finally decided, they should be scrupulously adhered to, and no deviation permitted. The criteria of format should be decided as soon as the materials for the research paper have been assembled. The following points deserve mention so far as the mechanics of writing a report are concerned:

13.2 OBJECTIVES

What is the mechanics of writing a research report?

What are the various steps of mechanics of research report?

13.3 SIZE AND PHYSICAL DESIGN

The manuscript should be written on ruled paper 81/2" x11" in size. If it is to be

written by hand, then black or blue-black ink should be used. A margin of at least one and one-half inches should be allowed at the left hand and of at least half an inch at the right hand of the paper. There should also be one-inch margins, top and bottom. The paper should be neat and legible. If the manuscript is to be typed, then all typing should by double-spaced on one side of the page only except for the insertion of the long quotations.

13.4 PROCEDURE

Various steps in writing the report should be strictly adhered (All such steps have already been explained earlier).

13.5 CHECK YOUR PROGRESS 1

1. What are the main objectives of writing a research report?
2. What factors determine the size and physical design of a research report?
3. What are the main steps involved in writing a research report?

13.6 LAYOUT

Keeping in view the objective and nature of the problem, the layout of the report should be thought of and decided and accordingly adopted (The layout of the research report and various types of reports have been described in this earlier which should be taken as a guide for report-writing in case of a particular problem).

13.7 TREATMENT OF QUOTATIONS

Quotations should be placed in quotation marks and double spaced, forming an immediate part of the text. But if a quotation is of a considerable length (more than four or five written lines) then if should be single-spaced and indented at least half an inch to the right of the normal text margin.

13.8 THE FOOTNOTES

Regarding footnotes one should keep in view the following:

13.8.1 The footnotes serve two purpose viz., the identification of materials used in quotations in the report and the notice of materials not immediately necessary to the body of the research text but still of supplemental value. In other words, footnotes are meant for cross references, citation of authorities and source, acknowledgement

and elucidation or explanation of a point of view. It should always be kept in view that footnote is an end nor a means of the display of scholarship. The modern tendency is to make the minimum use of footnotes for scholarship does not need to be displayed.

13.8.2 Footnotes are placed at the bottom of the page on which the reference or quotations which they identify or supplement ends. Footnoted are customarily separated from the textual material by a space of half an inch and a line about one and a half inches long.

13.8.3 Footnotes should be numbered consecutively, usually beginning with 1 in each chapter separately. The number should be put slightly above the line, say at the end of a quotation separately. The number should be put slightly above the line, say at the end of a quotation. At the foot of the page, again, the footnote number should be indented and typed a little above the line. Thus, consecutive numbers must be used to correlate the reference in the text with its corresponding note at the bottom of the page, except in case of statistical tables and other numerical material, where symbols such as the asterisk (*) or the like one may be used to prevent confusion.

13.8.4 Footnotes are always typed in single space though they are divided from one another by double space.

13.9 DOCUMENTATION STYLE

Regarding documentation, the first footnote reference to any given work should be complete in its documentation, giving all the essential facts about the edition used. Such documentary footnotes follow a general sequence. The common order may be described as under:

A. Regarding the single-volume reference

i. Author's name in normal order (and not beginning with the last name as in a bibliography) followed by a comma;

ii. Title of work, underlined to indicate italics;

iii. Place and date of publication;

iv. Pagination reference (The page number).

Example: John Gassner, Masters of the Drama, New York: Dover Publications, Inc, 1954,p.315.

B. Regarding multi volumed reference

I. Author's name in the normal order;

ii. Title of work, underlined to indicate italics;

iii. Place and date of publication;

iv. Number of volume;

v. Pagination references (The page number).

C. Regarding work arranged alphabetically

For works arranged alphabetically such as encyclopedias dictionaries, no pagination refrence is usually needed. In such cases the order is illustrated as under;

Example 1:

" Salamanca," Encyclopardia Britannica, 14th Edition.

Example 2:

" Mary Wollstonecraft Gofiwn," Dictionary of national biography.

But if there should be a detailed reference to a long encyclopedia article, volume and pagination reference may be found necessary.

D. Regarding periodicals reference

i. Name of the author in normal order;

ii. Title of article, in quotation marks;

iii. Name of periodical, underlined to indicate italics;

iv. Volume number;

v. Date of issuance;

vi. Pagination;

E. Regarding anthologies and collections reference

Quotations from anthologies or collections of literary works must be acknowledged not only by author, but also by the name of the collector.

F. Regrading second-hand quotations reference.

In such cases the documentations should be handled as follows:

i. Original author and title;

ii. "quoted or cited in.";

iii. Second author and work.

Example:

J.F Jones, life in Ploynesia, p.16 quoted in History of the Pacific Oceans area, by R.B Abel, p.191.

13.10 CHECK YOUR PROGRESS -II

1. What is the importance of layout in a formal document?
2. Name any two elements commonly found in a documents layout.
3 What is meant by documentation style?
4. What is the primary purpose of a footnote?

13.11 LET US SUM UP

In this chapter, we have discussed about Mechanism of Research Report.

The mechanics of writing a research report emphasize strict adherence to standardized techniques to ensure clarity, consistency, and professionalism. The manuscript should be on 8½" x 11" paper with specific margins (1½" left, ½" right, 1" top/bottom), double-spaced for typed reports, and legible. Quotations over four or five lines are single-spaced and indented, while footnotes, numbered consecutively per chapter, cite sources or provide supplementary details. Documentation follows a precise style, including author, title, publication details, and pagination for various sources (books, periodicals, anthologies). These rules ensure a scholarly, readable report that effectively communicates research findings.

13.12 KEYWORDS/GLOSSARY

Mechanics of Writing: Technical aspects of preparing a research report, including format, layout, and documentation rules.

Research Report Format: Standardized structure for presenting research findings, ensuring clarity and consistency.

Manuscript Size: Standard paper size (8½" x 11") for the research report.

Margins: Specified spaces (1½" left, ½" right, 1" top/bottom) around the text for readability and presentation.

Double-Spaced Typing: Typing with a full blank line between text lines for clarity, except for long quotations.

Quotations: Cited text from sources, double-spaced in the text or single-spaced and indented if over four lines.

Footnotes: Notes at the page bottom for citing sources or adding supplementary information, numbered consecutively.

Documentation Style: Consistent format for citing sources, including author, title, publication details, and pagination.

13.13 SELF ASSESMENT TEST

Q1. What is Mechanics of writing research report?

Q2. What factors determine the size and physical design of a research report?

Q3. What are the main steps involved in writing a research report?

Q4. What are the main objectives of writing a research report?

13.14 SUGGESTED READINGS

- S.K. Mangal, Shubhra Mangal.(2019). Research Methodology in Behavioural Sciences. PHI Learning Pvt. Ltd., Delhi
- C.R.Kothari, Gaurav Garg. (2022). Research Methodology: Methods and Techniques. New Age International Publishers. New Delhi
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- Koul, Lokesh, (1997) : Methdology of Educational Research, Vikas Publishing House Pvt. Ltd., pp. 88-108, New Delhi
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- Sukhia, S.P. Mehrotra, P.V. and Mehrotra, R.N. (1980) : Elements of Educational Research, Allied Publishers Pvt. Ltd, pp. 101-127, New Delhi