RMT 200 RESEARCH METHODOLOGY

TEACHING MANUAL FOR STUDENTS OF THE SECOND YEAR OF BACHELOR IN EDUCATION AT THE JORDAN UNIVERSITY COLLEGE

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I. INTRODUCTION

Science

The term science may be thought of as an approach to the gathering of knowledge rather as a field of subject matter. Science, put simply, consist of two primary functions:

1. The development of theory
2. The testing of substantive hypotheses that are deducted from theory.

Science & the Scientific Method:

A Definition by Alina Bradford, Live Science Contributor

Science is a systematic and logical approach to discovering how things in the universe work. It is also the body of knowledge accumulated through the discoveries about all the things in the universe.

The word "science" is derived from the Latin word scientia, which is knowledge based on demonstrable and reproducible data, according to the Merriam-Webster Dictionary.

True to this definition, science aims for measurable results through testing and analysis.

Science is based on fact, not opinion or preferences. The process of science is designed to challenge ideas through research.

One important aspect of the scientific process is that it is focuses only on the natural world, according to the University of California.

Anything that is considered supernatural does not fit into the definition of science.

The Scientific Method

When conducting research, scientists use the scientific method to collect measurable, empirical evidence in an experiment related to a hypothesis (often in the form of an if/then statement), the results aiming to support or contradict a theory.

The steps of the scientific method (in general):

1. Make an observation or observations.
2. Ask questions about the observations and gather information.
3. Form a hypothesis — a tentative description of what's been observed, and make predictions based on that hypothesis.
4. Test the hypothesis and predictions in an experiment that can be reproduced.
5. Analyze the data and draw conclusions; accept or reject the hypothesis or modify the hypothesis if necessary.
6. Reproduce the experiment until there are no discrepancies between observations and theory.

"The reproducibility of published experiments is the foundation of science. No reproducibility – no science."

Some key underpinnings to the scientific method

1. The hypothesis must be testable and falsifiable. (Falsifiable means that there must be a possible negative answer to the hypothesis.)

2. Research must involve deductive reasoning and inductive reasoning.

Deductive reasoning is the process of using true premises to reach a logical true conclusion while inductive reasoning takes the opposite approach.

3. An experiment should include a dependent variable (which does not change) and an independent variable (which does change).

An experiment should include an experimental group and a control group.

Scientific theories and laws

The scientific method and science in general can be frustrating.

A theory is almost never proven, though a few theories do become scientific laws. Laws are generally considered to be without exception, though some laws have been modified over time after further testing found discrepancies.

This does not mean theories are not meaningful.

For a hypothesis to become a theory, rigorous testing must occur, typically across multiple disciplines by separate groups of scientists.

Saying something is "just a theory" is a layperson's term that has no relationship to science. To most people a theory is a hunch.

In science a theory is the framework for observations and facts.

II. RESEARCH

'Research' is a term loosely used in everyday speech to describe a multitude of activities, such as collecting masses of information, delving into esoteric theories, and producing wonderful new products. It is important that a student or practitioner embarking on a programme of academic or practical research has a clear idea of what the word 'research' really means, and clears away any misconceptions that might exist owing to the word's common use in other fields.

It is, therefore, worth looking at a few of the ways that the word is used in common language to describe activities, often called research, which are not research in its real meaning, and also at some of the emotive language that surrounds the term.

Scientific method in research

Scientific method is the discipline which forms the foundation of modern scientific enquiry.

Scientific method has been applied, to a greater or lesser extent, to research in some areas not principally thought of as 'scientific', such as sociology, psychology and education.

According to Cohen and Manion there are five (5) major assumptions underlying scientific method.

1. The belief that there is some kind of order in the universe, and that it is possible for us to gain some understanding of this order.

2. In order to enable us to gain this under-standing of the world, there must be an agreement between people that external reality exists, and that people recognize the same reality, a public or shared reality.

3. The reliability of human perception and intellect. Despite the many ways in which our senses can be tricked, researchers depend on their senses to record and measure their work reliably.

4. The principle of parsimony. Phenomena should be explained in as economic a manner as possible. Needless complexity is abhorred, and scientists aim to achieve the most elegant and simple theories.

5. The generality. This is the assumption that there can be valid relationships between the particular cases investigated by the researcher and the general situation in the world at large.

Characteristics of research which uses scientific method

Accepting these assumptions, research using the scientific method displays six characteristics which distinguish it from other methods of enquiry

1. It is generated by a question

We are surrounded by unanswered questions, unresolved problems, with conjecture and unproven beliefs.

A questioning mind is the precondition for research.

What, When, Where, Who, How, Why

Why, how, when do things happen?

What do events mean?

What caused them?

All these are questions which can generate research activity.

Such a question is often referred to as the research problem.

2. It necessitates clarification of a goal

Without a clear statement of the objectives and what is intended to be done, the research cannot be successful.

3. It entails a specific programme of work

Research needs to be carefully planned in order to achieve its objectives and reach conclusions.

4. It is aimed at increasing understanding by interpreting facts or ideas and reaching some conclusions about their meaning

The significance of facts or ideas depends on the way in which the intellect can extract meaning from them.

5. It requires reasoned argument to support conclusions

In order to communicate an ordered sequence of ideas, a clear logical argument is required.

6. It is reiterative in its activities

Advances in knowledge and interpretations of facts are based on previous knowledge, which, in turn, is expanded by the advances.

Then resolution of research problems often gives rise to further problems which need resolving.

Research often:

Divides the principal question or problem into more practicable sub-questions or problems. Problems are often too large or abstract to examine as a whole.

Dividing them into component parts (sub-problems) enables them to be practically investigated.Is tentatively guided by assertions called hypotheses (informed guesses or tentative assertions). Testing these hypotheses provides a direction for exploration. Requires measurable data in attempting to answer the question which initiated the research

These are some of the ways in which the term 'research' is wrongly used:

As a mere gathering of facts or information - "I'll go and do a bit of research into the subject."

Moving facts from one situation to another - “I have done my research, and come up with this information which I present in this paper.”

As an esoteric activity, far removed from practical life - “He’s just gone back into his laboratory to bury himself in his research into the mysterious processes of bimolecular fragmentation.”

As a word to get your product noticed - “Years of painstaking research have produced this revolutionary, labour-saving product!”

So how can true research be defined?

The Oxford Encyclopedic English Dictionary defines it as:

(a) the systematic investigation into the study of materials, sources etc. in order to establish facts and reach new conclusions

(b) an endeavour to discover new or collate old facts etc. by the scientific study of a subject or by a course of critical investigation.

Definition of scientific method by Merriam-Webster

principles and procedures for the systematic pursuit of knowledge involving the recognition and formulation of a problem, the collection of data through observation and experiment, and the formulation and testing of hypotheses

John Dewey (1938) suggested a pattern (A Method in Science) that is helpful in identifying the elements of a deductive-inductive process:

Identification and Definition of the problem

Formulation of a hypothesis – an idea as to a probable solution to the problem, an intelligent guess or hunch

Formulation of conclusions

Verification, rejection, or modification of the hypothesis by the test of its consequences in a specific situation

III DEDUCTION AND INDUCTION

Experience and reasoning

What is certain is that there are many different opinions about and approaches to research. However, as a means of achieving a greater comprehension of our world, research distinguishes itself from the two other basic and more ancient means, those of experience and reasoning.

Experience results in knowledge and understanding gained either individually or as a group or society, or shared by experts or leaders, through day-to-day living. Reflective awareness of the world around us, present to a degree even in other mammals, provides invaluable knowledge. The most immediate form of experience is personal experience, the body of knowledge gained individually through encountering situations and events in life.

A child learns to walk by trial and error, and an adult gets adept atdecorating jobs in the house after renovating several rooms.

When solutions to problems are not to be found within the personal experience of an individual, then he or she may turn to those who have wider or more specialist experience for advice, for example a solicitor in legal matters.

Beyond this are the ‘experts’ who have written books on particular subjects, e.g. health care or the finer points of playing golf.

Reasoning is a method of coming to conclusions by the use of logical argument.

There are three basic forms of reasoning:

- deductive,
- inductive

- and a combination of both called inductive/deductive.

Deductive reasoning was first developed by the Ancient Greeks, and was refined by Aristotle (384-322 BC) through his deductive syllogisms. An argument based on deduction begins with general statements and, throughlogical argument, comes to a specific conclusion.

Here is a simple example: 1. All live mammals breathe; 2. This cow is a live mammal;3.Therefore, this cows breathes.

Inductive reasoning works the other way round.

Developed by Francis Bacon (22.1.1561- 9.4.1626) "Beconian Method", He advocated direct observation of phenomena, arriving at conclusions or generalisation through the evidence of many individual observation. Considered as the father of Empiricism

Inductive reasoning: It starts from specific observations and derives general conclusions therefrom. A simple example will demonstrate the line of reasoning: 1. All swans which have been observed are white in colour; 2. Therefore one can conclude that all swans are white.

But when inductive and deductive reasoning were combined to form inductive/deductive reasoning, the to-and-fro process of developing hypotheses (testable theories) inductively from observations, charting their implications by deduction, and testing them to refine or reject them in the light of the results, formed a powerful basis for the progress of knowledge, especially of scientific knowledge.

It is the combination of experience with deductive and inductive reasoning which is the foundation of modern scientific research.

Three characteristics of research can be seen to distinguish it from gaining knowledge purely by experience or reasoning:

1. Gaining experience is an uncontrolled and haphazard activity, while research is systematic and controlled.
2. Reasoning can operate in an abstract world, divorced from reality, while research is empirical and turns to experience and the world around us for validation.
3. Unlike experience and reason, research aims to be self-correcting. The process of research involves rigorously testing the results obtained, and methods and results are open to public scrutiny and criticism.

Research is a combination of both experience and reasoning and must be regarded as the most successful approach to the discovery of truth." (Louis Cohen and Lawrence Manion, "Research Methods in Education, 1994)

The Objectives of Research

Research can have several legitimate objectives, either singly or in combination.

The main, overriding objective must be that of gaining useful or interesting knowledge.

Usually there are six things, that we believe, most people expected scientific knowledge to provide:

Categorization
Explanation
Prediction
Creating a sense of understanding
Providing potential for control
Evaluation

Categorization involves forming a typology of objects, events or concepts. This can be useful in explaining what 'things' belong together and how.

One of the main problems is to decide on the most useful methods of categorization, depending on the reasons for attempting the categorization in the first place. There are many events and issues that we do not fully, or even partly, understand.

The objective of providing an explanation of particular phenomena has been a common one in many forms of research.

On the basis of an explanation of a phenomenon it is often possible to make a prediction of future events related to it. More readily understood are predictions made in text form, for example: if a person disagrees with a friend about his attitude toward an object, then a state of psychological tension is produced.

Whilst explanation and prediction can reveal the inner workings of phenomena, i.e. what happens and when, they do not always provide a sense of understanding of phenomena – how or why they happen.

A good level of understanding of a phenomenon might lead to the possibility of finding a way to control it. The crucial issue in control is to understand how certain variables affect one another, and then be able to change the variables in such a way as to produce predictable results.

Evaluation is making judgements about the quality of objects or events. Quality can be measured either in an absolute sense or on a comparative basis. To be useful, the methods of evaluation must be relevant to the context and intentions of the research. It is the context of the research which will help to establish the types of values that should be used.

IV. BASIC TERMINOLOGY

Educational research:

Education research is the scientific field of study that examines education and learning processes and the human attributes, interactions, organizations, and institutions that shape educational outcomes. Scholarship in the field seeks to describe, understand, and explain how learning takes place throughout a person's life and how formal and informal contexts of education affect all forms of learning. Education research embraces the full spectrum of rigorous methods appropriate to the questions being asked and also drives the development of new tools and methods.

Knowledge:

Human faculty resulting from interpreted information; understanding that germinates from combination of data, information, experience and individual interpretation.

The fact or condition of knowing something with familiarity gained through experience or association

Acquaintance with or understanding of a science, art, or technique

The fact of or condition of being aware of something

Facts, information, and skill acquired through experience or education

The theoretical or practical understanding of a subject

Different Method of acquiring knowledge

1. Intuition: Gut feeling; hunches; instinct Disadvantage: Not credible basis.

2. Anecdotal Evidence: Accept unquestioningly what your own personal judgment or a single story about a person's experience tells you about the world. Negative: Subjective.

3. Authority of Faith: Expert/respected source. Sacred texts/individuals, internet. Negative: Answers obtained from an expert could represent subjective, personal opinion rather than true expert knowledge. Also, method of faith.

4. Tenacity: Long-held beliefs. Repetition makes ideas more believable-Chichés, superstitions-Politics Negative: Information acquired may not be accurate

5. Rationalism: Seeking answers using logical reasoning.(All apples are fruits. Some fruits are oranges. Therefore, some apples are oranges.) Negative: These are not valid arguments because the conclusion is not logically justified by the premise statements.

6. Empiricism (Observation via senses): Attempts to answer questions by direct observation or personal experience. Negative: Your perceptions can be altered by prior knowledge, expectations, feelings, or beliefs. Therefore, 2 observers can witness the same event but "see" different things.

7. Science: Science employs rationalistic logic and checks each step with empirical observations.

Research: the systematic, rigorous investigation of a situation or problem in order to generate new knowledge or validate existing knowledge

Classification of research

- by Purpose
- by Method –

Purpose:

Applied research: refers to scientific study and research that seek to solve practical problems. Applied research is used to find solution to everyday problems, cure illness, and develop innovative technologies, rather than to acquire knowledge for knowledge's sake

Basic research: is driven by a scientist's curiosity or interest in a scientific question. The main motivation is to expand man's knowledge, not to create or invent something. There is no obvious commercial value to the discoveries that result from basic research

(extra division of a research by purpose:

Following are the different types of research on the basis of purpose.

Pure Research

Pure research is theoretical type not a practical one. Pure research is the knowledge of facts and theories to give us satisfaction of knowledge and understanding. It discovers general principles for a problem solution. Following are some of the features.

It keeps the foundation of initial study.

It discovers new facts.

It gives theoretical reports for solution.

Applied Research

Applied research is the implementation of theoretical study upon a problematic situation. It applied its theories and facts to know about the nature of the problem and give a concrete shape for the solution. This is practical work in the field. Following are the features of such type of research.

It tests and verifies theories

It discovers new facts

It gives immediate answer to a question

Action Research

Action research is based on the taking of immediate action on a happening, event or situation. The researcher is actively involved in the solution of the problems. Second World War created many types of problems for which action research was necessary. These problems including (flood, epidemic, earthquake, fire) etc. features are as under.

It is quick service oriented
It is taking immediate action
It is sensitive to time and place
Evaluation Research

This type of research is an evaluation of some programs working for the construction of problematic areas. It is the dankness of implemented programmes about their effects and positive solution. There are three main types of evaluation.

Concurrent evaluation-means continuous process
Phase or periodic evaluation-stage wise.
Terminal evaluation-Evaluation after the completion of the programme.
Inter Disciplinary Research

It is the study of structure or functions of a particular discipline or comparison of one discipline with another. In other words it is the comparison of a developmental stage. It is also called co-ordinate research. Features are the following.

It is a cooperative research
It helps in study the whole phenomena
It brings comparison in different disciplines

V. RESEARCH STRUCTURE

Introduction

Social research is all around us. Educators, governments officials, business managers, human service providers, and health care professionals – regularly use social research methods and findings

People use social research to raise children, reduce crime, improve public health, sell products, or just understand one's life.

Reports of research appear on broadcast news programs, in popular magazines, in news papers, and on the Internet.

Social research – is a process in which people combine a set of principles, outlooks, and ideas (methodology) with a collection of specific practices, techniques, and strategies (method of inquiry) to produce knowledge.

Research – is a way of going about finding answers to questions.

Through research we learn something new about the social world; or we carefully document guesses, hunches, or believes about it; or we refine the common understanding of how the social world works. Word 'Research' is comprises of two words = Re+Search. It means to search again. So research means a systematic investigation or activity to gain new knowledge of the already existing facts.

Research is an intellectual activity. It is responsible for bringing to light new knowledge. It is also responsible for correcting the present mistakes, removing existing misconceptions and adding new learning to the existing fund of knowledge. Researches are considered as a combination of those activities which are removed from day to day life and are pursued by those persons who are gifted in intellect and sincere in pursuit of knowledge. But it is not correct to say that the research is restricted to such type of persons, however, it is correct to say that major contribution of research comes from highly gifted and committed workers. Thus the research is not at all mysterious and is carried on by hundreds of thousands of average individuals.

Research is also considered as the application of scientific method in solving the problems. It is a systematic, formal and intensive process of carrying on the scientific method of analysis. There are many ways of obtaining knowledge. They are intuition, revelation,

and authority, logical manipulation of basic assumptions, informed guesses, observation, and reasoning by analogy. One of the branches of research known as empirical research is highly goal-oriented technique.

A researcher combines THEORIES or IDEAS with FACTS in a careful, systematic way and uses creativity. Appropriate techniques have to be selected carefully and planned to address a specific kind of question. All the process is to be done in ethical and moral way. In addition, a researcher must fully communicate the results of a study to others.

The following are the important definitions of research:

"Research is an endeavor / attempt to discover, develop and verify knowledge. It is an intellectual process that has developed over hundreds of years ever changing in purpose and form and always researching to truth." (J. Francis Rummel)

"Research is an honest, exhaustive, intelligent searching for facts and their meanings or implications with reference to a given problem. The product or findings of a given piece of research should be an authentic, verifiable contribution to knowledge in the field studied." (P.M. Cook)

"Research may be defined as a method of studying problems whose solutions are to be derived partly or wholly from facts." (W.S. Monroes)

"Research is considered to be the more formal, systematic intensive process of carrying on the scientific method of analysis. It involves a more systematic structure of investigation, usually resulting in some sort of formal record of procedures and a report of results or conclusion." (Clifford Woody)

"Research is a systematic effort to gain new knowledge." (Redman & Mori)

"Social research may be defined as a scientific undertaking which by means of logical and systematized techniques aims to discover new facts or verify and test old facts , analyse their sequences , inter- relationships and casual explanation which were derived within an appropriate theoretical frame of reference , develop new scientific tools , concepts and theories which would facilitate reliable and valid study of human behavior." (P.V. Younge)

Purpose of Research:

The purpose of research is to discover answers to questions through the application of scientific procedure. The main aim of research is to find out the truth which is hidden and which has not been discovered as yet. Though each research study has its own specific purpose, some general objectives of research below:

(i) To gain familiarity with a phenomenon or to achieve new insights into it. (Studies with this object in view are termed as exploratory or formative research studies).

(ii) To portray accurately the characteristics of a particular individual, situation or a group. (Studies with this object in view are known as descriptive research studies).

(iii) To determine the frequency with which something occurs or with which it is associated with something else. (Studies with this object in view are known as diagnostic research studies).

(iv) To test a hypothesis of a causal relationship between variables. (Such studies are known as hypothesis-testing research studies).

Characteristics of Research:

Following are the characteristics of research;

(i) Research is directed toward the solution of a problem.

(ii) Research requires expertise.

(iii) Research emphasizes the development of generalizations, principles, or theories that will be helpful in predicting future occurrences.

(iv) Research is based upon observable experience or empirical evidences.

(v) Research demands accurate observation and description.

(vi) Research involves gathering new data from primary or first-hand sources or using existing data for a new purpose.

(vii) Research is characterized by carefully designed procedures that apply rigorous analysis.

(viii) Research involves the quest for answers to un-solved problems.

(ix) Research strives to be objective and logical, applying every possible test to validate the procedures employed the data collected and the conclusions reached.

(x) Research is characterized by patient and unhurried activity.

(xi) Research is carefully recorded and collected.

(xii) Research sometimes requires courage.

Types of Research:

There are varieties of ways through which we may classify it into different categories.

(A) On the basis of nature of information:

On the basis of nature of information we can classify the research into two types;

(i) Qualitative Research: When information is in the form of qualitative data.

(ii) Quantitative Research: When information is in the form of quantitative data.

(B) On the basis of utility of content or nature of subject matter of research:

On the basis of these criteria we can categorize the research into two categories.

(i) Basic/ Fundamental /pure or Theoretical Research: Its utility is universal.

(ii) Experimental or Applied Research: Its utility is limited.

(C) On the basis of approach of research:

We may classify research into two different categories.

(i) Longitudinal Research: Examples of this category are historical, Case study and Genetic research.

(ii) Cross-Sectional Research: Examples of this category are Experimental and Survey Research.

(D) On the basis of method of research :

On the basis of research method we may classify a research into five different categories.

(i) Philosophical Research: It is purely qualitative in nature and we are focusing on the vision of others on the content of research.

(ii) Historical Research: It is both qualitative as well as quantitative in nature and deals with past events.

(iii) Survey Research: It deals with present events and is quantitative in nature. It may further be sub-divided into; discretional, correlational and exploratory type of research.

(iv) Experimental Research: This is purely quantitative in nature and deals with future events.

(v) Case-Study Research: It deals with unusual events. It may be qualitative as well as quantitative in nature depending upon the content.

Example of a research:

1. I am working on the topic X (stories about the Battle of the Alamo)
2. because I want to find out Y (why its story became a national legend)

3. so that I can help others understand Z (how such regional myths have shaped our national character).

Then:

1. I am working on the topic X (*WHY*?)
2. because I want to find out how/ why/ whether Y (So what if you do?)
3. so that I can help others understand how/ why/ whether Z.

Conceptual Questions: What Should We Think? A question is conceptual when your answer to *So what?* doesn't tell readers what to do but helps them understand some issue:

Practical Questions: What Should We Do? You pose a different kind of question—call it a practical one—when your answer to *So what?* tells readers what to do to change or fix some troublesome or at least improvable situation:

Practical questions are most common outside the academic world, especially in business. In academic fields such as health care and engineering, researchers sometimes ask practical questions, but more often they ask a third kind of question that's neither purely practical nor purely conceptual: call it an applied research question.

Alternatives to Social Research:

- what parents and friends have told me
- personal experience
- what you have learnt from books, magazines, Internet
- what you have seen or heard in TV, Internet

All these might be summarized as a "*common sense*."

Some other examples of Alternatives:

- Authority
- Tradition
- Common sense
- Media myths
- Personal experience

What separates Alternatives from Social Research it is SCIENCE.

Science it is a social institution and a way to understand how things and working in the universe and to produce knowledge.

Usually *science* is divided in to *Natural Science* and *Social Science*

Natural Science deals with the physical and material world, *i.e* astronomy, biology, chemistry, geology, and physics.

Social Science involve the study of people – their believes, behaviors, interaction, institutions, and so forth. (i.e. anthropology, psychology, political science and sociology).

Scientists gather data using specialized techniques and use the data to *support* or *reject* theories.

VI. RESEARCH PROCESS

Preparing of the Report or Presentation of the Result

(i) Formulation of Research Problem:

At the very outset, the researcher must decide the general area of interest or aspect of a subject matter that he would like to inquire into and then research problem should be formulated.

(ii) Extensive Literature Survey:

Once the problem is formulated the researcher should undertake extensive literature survey connected with the problem. For this purpose, the abstracting and indexing journals and published or unpublished bibliographies are the first place to go to academic journals, conference proceedings, government reports, books etc. must be tapped depending on the nature of the problem.

(iii) Development of Working Hypothesis:

After extensive literature survey, researcher should state in clear terms the working hypothesis or hypotheses. Working hypothesis is tentative assumption made in order to draw out and test its logical or empirical consequences. It's very important or it provides the focal point for research.

(iv) Preparing the Research Design:

After framing hypothesis we have to prepare a research design i.e. we have to state the conceptual structure within which research would be conducted. The preparation of such a design facilitates research to be as efficient as possible yielding maximal information. In other words, the function of research design is to provide for the collection of relevant evidence with optimum effort, time and expenditure. But how all these can be achieved depends mainly on the research purpose.

(v) Determining Sample Design:

A sample design is a definite plan determined before any data is actually collected for obtaining a sample from a given population. in census inquiry we involve a great deal of time, money and energy so it it not possible in practice under many circumstances. Sample designs can be either probability or non-probability. With probability samples each element has a known probability of being included in the sample but the non-probability samples do not allow the researchers to determine this probability.

(vi) Collecting the Data:

There are several ways of collecting the appropriate data which differ considerably in context of cost, time and other resources at the disposal of the researcher. Primary data can be collected either through experiment or through survey. In case of survey, data can be collected by any one or more of the following ways;

By observation,

-Through personal interview,

-Through telephonic interviews,

-By mailing of questionnaires or

-Through schedules.

(vii) Execution of the Project:

Execution of project is a very important step in the research process. If the execution of the project proceeds on correct lines, the data to be collected would be adequate and dependable .A careful watch should be kept for unanticipated factors in order to keep the survey realistic as much as possible.

(viii) Analysis of Data:

The analysis of data requires a number of closely related operations such as establishment of categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inference. Analysis work after tabulation is generally

based on the computation of various percentages; coefficients etc., by applying various well defined statistical formulae. In the process of analysis, relationships of differences supporting or conflicting with original or new hypothesis should be subjected to tests of significance to determine with what validity data can be said to indicate any conclusions.

(ix) Hypothesis Testing:

After analyzing the data, the researcher is in a position to test the hypothesis, if any, he had formulated earlier. Do the facts support the hypothesis or they happen to be contrary? This is the usual question which is to be answered by applying various tests like 't' test, 'F' test etc. F test have been developed by statisticians for the purpose. Hypothesis testing will result in either accepting the hypothesis or in rejecting it. If the researcher had no hypothesis to start with, generalizations established on the basis of data may be stated.

(x) Generalizations and Interpretation:

If a hypothesis is tested and upheld several times, it may be possible for the researcher to arrive at generalization i.e. to build a theory. As a matter of fact, the real value of research lies in its ability to arrive at certain generalizations. If the researcher had no hypothesis to start with, he might seek to explain his findings on the basis of some theory. It is known as interpretation.

(xi) Preparation of the Report or the Thesis:

Finally, the researcher has to prepare the report of what has been done by him. The layout of the report should be as follows; the preliminary pages, the main text and end matter. The preliminary pages carry title, acknowledgements and forward and then index. The main text of the report should have introduction, review of literature and methodology.

Criteria of Good Research:

One expects scientific research to satisfy the following criteria:

(a) The purpose of the research should be clearly defined and common concepts be used.

(b) The research procedure used should be described in sufficient detail to permit another researcher to repeat the researcher for further advancement, keeping the continuity of what has already been attained.

(c) The procedural design of the research should be carefully planned to yield results that are as objective as possible.

(d) The researcher should report with complete frankness, flaws in procedural design and estimate their effects upon the findings.

(e) The analysis of data should be sufficiently adequate to reveal its significance and the methods of analysis used should be appropriate. The validity and reliability of the data should be checked carefully.

(f) Conclusions should be confined to those justified by the data of the research and limited to those for which the data provide an adequate basis.

(g) Greater confidence in research is warranted if the researcher is experienced, has a good reputation in research and is a person of integrity.

Research Design

A research design is simply the framework or plan for a study that is used as a guide in collecting and analyzing the data. It is a blueprint that is followed in completing a study. Research design is the blue print for collection measurement and analysis of data. Actually it is a map that is usually developed to guide the research.

Definitions:

"Research design is a master plan specifying the methods and procedures for collection and analyzing the needed information." William Zikmund

"Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance." Kerlinger

Thus we can say that a research design is the arrangement of condition for collection and analysis of data in a manner that aims to generalize the findings of the sample on the population.

Purpose of a Research Design:

Research designs are used for the following purposes;

(i) To minimize the expenditure:

Research design carries an important influence on the reliability of the results attained .It therefore provides a solid base for the whole research. This makes the research as effective as possible by providing maximum information with minimum spending of effort, money and time by preparing the advance plan of all about the research.

(ii) To facilitate the smooth scaling:

Research design is needed because it facilitates the smooth scaling of the various research operations, thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money.

(iii) To collect the relevant data and technique:

Research design stands for advance planning of the methods to be adopted for collecting the relevant data and the techniques to be used in their analysis, keeping in view the objective of the research and the availability of staff time and money. Poor preparation of research design upset the entire project.

(iv) To provide blue print for plans:

Research design is needed due to the fact that it allows for the smooth working of many research operations. It is like blue print which we need in advance to plan the methods to be adopted for collecting the relevant data and techniques to be used in its analysis for preparation of research project. Just as for better economical and attractive construction of a house need a blue print and a map of that, similarly we needs a blue print or a design for the smooth flow of operation of research.

(v) To provide an overview to other experts:

A research design provides an overview of all the research process and with the help of the design we can take the help and views of experts of that field The design helps the investigator to organize his ideas , which helps to recognize and fix his faults.

(vi) To provide a direction:

A research design provides a proper or particular direction to the other executives and others who are helping us into the process. The researcher studies available, literature and learns about new (alternative approaches.

Characteristics of Good Research Design:

Generally a good research design minimizes bias and maximizes the reliability of the data collected and analyzed. The design which gives the smallest experimental error is reported to be the best design in scientific investigation. Similarly, a design which yields maximum information and provides an opportunity for considering different aspects of a problem is considered to be the most appropriate and efficient design. A good research design possesses the following characteristics;

(i) Objectivity:

It refers to the findings related to the method of data collection and scoring of the responses. The research design should permit the measuring instruments which are fairly objective in which every observer or judge scoring the performance must precisely give the same report. In other words, the objectivity of the procedure may be judged by the degree of agreement between the final scores assigned to different individuals by more than one independent observer. This ensures the objectivity of the collected data which shall be capable of analysis and interpretation.

(ii) Reliability:

It refers to consistency throughout a series of measurements. For example, if a respondent gives out a response to a particular item, he is expected to give the same response to that item even if he is asked repeatedly. If he is changing his response to the same item, the consistency will be lost. So the researcher should frame the items in a questionnaire in such a way that it provides consistency or reliability.

(iii) Validity:

Any measuring device or instrument is said to be valid when it measures what it is expected to measure. For example, an intelligence test conducted for measuring the IQ should measure only the intelligence and nothing else and the questionnaire shall be framed accordingly.

(iv) Generalizability:

It means how best the data collected from the samples can be utilized for drawing certain generalizations applicable to a large group from which sample is drawn. Thus a research design helps an investigator to generalize his findings provided he has taken due care in defining the population, selecting the sample, deriving appropriate statistical analysis etc. while preparing the research design. Thus a good research design is one which is methodologically prepared and should ensure that generalization is possible. For ensuring the generalization we should confirm that our research problem has the following characteristics;

a) The problem is clearly formulated.

b) The population is clearly defined.

c) Most appropriate techniques of sample selection are used to form an appropriate sample.

d) Appropriate statistical analysis has been carried out.

e) The findings of the study are capable of generalizations.

(v) Adequate Information:

The most important requirement of good research design is that it should provide adequate information so that the research problem can be analyzed on a wide perspective. An ideal design should take into account important factors like;

(i) Identifying the exact research problem to be studied

(ii) The objective of the research

(iii) The process of obtaining information

(iv) The availability of adequate and skilled manpower and

(v) The availability of adequate financial resources for carrying research.

(vi) Other Features:

Some other important features of a good research design are flexibility, adaptability, efficiency, being economic and so on. A good research design should minimize bias and maximize reliability and generalization.

VII. RESEARCH PROBLEM

The problems lie everywhere around us. They even lie at our door step and in our backyards. Human nature is so complicated, that a problem solved for one individual may

still exist for another individual, a problem solved for one class/ school/teacher/ situation/ system/time etc., still remains a problem for another class/ school/ teacher/ situation/system/time or a problem solved for the time being may reappear with a lapse of time. We become habitual of living in the age of problems i.e. we are so much surrounded by the problem that we suffers from /'problem blindness". But in order to solve the problem or making research we need to delimit the problem.

Selection of problem is not the first step in research but identification of the problem is the first step in research. Selection of problem is governed by reflective thinking. It is wrong to think that identification of a problem means to select a topic of a research or statement of the problem.

A topic or statement of the problem and research problem are not the synonyms but they are inclusive. The problem concerns with the functioning of the broader area of field studied, whereas a topic or title or statement of the problem is the verbal statement of the problem. The topic is the definition of the problem which delimits or pin points the task of a researcher.

It is the usual practice of the researcher that they select the topic of the study from different sources especially from research abstracts. They do not identify the problem, but a problem is made on the basis of the topic. It results that they have no active involvement in their research activities, whatever, they do, do mechanically.

Definitions of the Problem:

The obstacles which hinder our path are regarded as problem. Different definitions of the problem are given below;

"Problem is the obstacle in the path of satisfying our needs." John Geoffery

"Problem is a question which is to be solved." John. G. Tornsand

"To define a problem means to put a fence around it, to separate it by careful distinctions from like questions found in related situations of need." Whitney

"A problem is a question proposed for a solution generally speaking a problem exists when there is a no available answer to same question." J.C. Townsend

"A problem is an interrogative sentence or statement that asks: What relation exists between two or more variables?" F.N. Kerlinger

"To define a problem means to specify it in detail and with precision each question and subordinate question to be answered is to be specified, the limits of the investigation must be determined. Frequently, it is necessary to review previous studies in order to determine just what is to be done. Sometimes it is necessary to formulate the point of view or educational theory on which the investigation is to be based. If certain assumptions are made, they must be explicitly noted." Monero and Engelhart

Identification of a Research Problem:

The following steps are to be followed in identifying a research problem;

Step I Determining the field of research in which a researcher is keen to do the research work.

Step II The researcher should develop the mastery on the area or it should be the field of his specialization.

Step III He should review the research conducted in area to know the recent trend and studies are being conducted in the area.

Step IV On the basis of review, he should consider the priority field of the study.

Step V He should draw an analogy and insight in identifying a problem or employ his personal experience of the field in locating the problem. He may take help of supervisor or expert of the field.

Step VI He should pin point specific aspect of the problem which is to be investigated.

The Sources of the Problem:

(i) The classroom, school, home, community and other agencies of education are obvious sources.

(ii) Social developments and technological changes are constantly bringing forth new problems and opportunities for research.

(iii) Record of previous research such specialized sources as the encyclopedias of educational, research abstracts, research bulletins, research reports, journals of researches, dissertations and many similar publications are rich sources of research problems.

(iv) Text book assignments, special assignments, reports and term papers will suggest additional areas of needed research.

(v) Discussions-Classroom discussions, seminars and exchange of ideas with faculty members and fellow scholars and students will suggest many stimulating problems to be solved, close professional relationships, academic discussions and constructive academic climate are especially advantageous opportunities.

(vi) Questioning attitude: A questioning attitude towards prevailing practices and research oriented academic experience will effectively promote problem awareness.

(vii) The most practical source of problem is to consult supervisor, experts of the field and most experienced persons of the field. They may suggest most significant problems of the area. He can discuss certain issues of the area to emerge a problem.

Although research problems should not be assigned or they should not be proposed and allotted by a guide but consultation with the more experienced faculty member or research worker is a desirable practice.

One of the most important functions of the research guide is to help the student clarify his thinking, achieve a sense of focus and develop a manageable problem from one that may be vague and too complex.

Statement of Problem:

Kerlinger has identified following three criteria of good problem statements;

1. A problem should be concerned with relation between two or more variables.
2. It should be stated ‘clearly and unambiguously in question form’.
3. It should be amenable to empirical testing.

Meeting these criteria in his problem statement will result, in a clear and concise idea of what the researcher wants to do. This sets the state for further planning.

Objectives of Assumptions about the Problem:

1. To make the research work feasible.
2. To delimit the scope of the problem.
3. To establish the proper frame of reference.

Aspects of Delimiting a Problem:

1. Delimited to certain variables that should be mentioned clearly in the problem.
2. Delimited to the area or level as primary level, secondary level, college or university level.
3. Delimited to size of sample, considering the time, energy and money.
4. Delimited to the best method only.
5. Delimited to the best available tool for measuring the variable.
6. Delimited to the most appropriate techniques.
7. Other delimitations particular to a problem.

As the above delimitations help the researcher for conducting the study, the findings of studies also confine to these delimitations.

Evaluation of the Problem:

When considering a problem a researcher is required to ask himself a series of questions about it. These are helpful in the evaluation of the problem on the basis of personal suitability of the researcher and social value of the problem.

Following questions must be answered affirmatively before the study is under Taken:

1. Is the Problem Researchable?
2. Is the Problem New?
3. Is the Problem Significant?
4. Is the Problem Feasible for the Particular Researcher?

In order to be feasible, a problem should agree with the following:

a) Research competencies of the Researcher
b) Interest and enthusiasm of the Researcher
c) Financial consideration in the Project
d) Time requirement for the Project
e) Administrative considerations in the Project.

VIII. VARIABLES (MIDDLE TERM TEST)

Variable is a concept which can take on different quantitative values. For example; height, weight, income, age etc. The main focus of the scientific study is to analyze the functional relationship of the variables. A variable is a quantity which can vary from one individual to another. The quantity which can vary from person to person.

"Variable is a property that taken on different value", (Kerlinger)

It is any feature or aspect of an event, function or process that, by its presence and nature, affects some other event or process, which is being studied.

(i) Continuous/Quantitative Variable:

It is that which can assume any numerical value within a specific range.

(ii) Constant/Categorical Variable

It is a variable that doesn't change its value.

(iii) Dependent Variable or Criterion variable:

If one variable depends or is a consequence of other, it is termed as dependent variable. Criterion variable is the basis on which the effectiveness of the experimental variable is studied.

(iv) Independent Variable or Experimental Variable:

The variable that is antecedent to the dependent variable is termed as an independent variable. The variable whose effect is going to be known is known as experimental variable. A study must always be so designed that the effect upon the dependent variable is attributed entirely to the independent variables

IX. FORMULATION OF HYPOTHESIS

The word hypothesis consists of two words -Hypo+Thesis. 'Hypo' means tentative or subject to the verification. 'Thesis' means statement about solution of the problem. Thus the literal meaning of the term hypothesis is a tentative statement about the solution of the problem. Hypothesis offers a solution of the problem that is to be verified empirically and based on some rationale.

Again, 'hypo' means the composition of two or more variables which are to be verified and 'thesis' means position of these variables in the specific frame of reference.

Definitions of Hypothesis:

"Any supposition which we make in order to endeavor to deduce conclusions in accordance with facts which are known to be real under the idea that if the conclusions to which the hypothesis leads are known truths, the hypothesis itself either must be or at least likely to be true." J.S. Mill

"A hypothesis is a tentative generalization the validity of which remains to be tested. In its most elementary stage the hypothesis may be any hunch, guess, imaginative idea which becomes basis for further investigation." Lundberg

"It is a shrewd guess or inference that is formulated and provisionally adopted to explain observed facts or conditions and to guide in further investigation." John W. Best

"A hypothesis is a statement temporarily accepted as true in the light of what is, at the time, known about a phenomenon, and it is employed as a basis for action in the search for new, truth, when the hypothesis is fully established, it may take the form of facts, principles and theories." Barr and Scates

"Hypothesis is an assumption whose testability is to be tested on the basis of the compatibility of its implications with empirical evidence and previous knowledge." Gorge J. Mouly

Nature of Hypothesis:

(i) Conceptual: Some kind of conceptual elements in the framework are involved in a hypothesis.

(ii) Verbal statement in a declarative form: It is a verbal expression of ideas and concepts. It is not merely mental idea but in the verbal form, the idea is ready enough for empirical verification.

(iii) It represents the tentative relationship between two or more variables.

(iv) Forward or future oriented: A hypothesis is future-oriented. It relates to the future verification not the past facts and information.

(v) Pivot of a scientific research: All research activities are designed for verification of hypothesis.

Functions of Hypothesis:

H.H. Mc Ashan has mentioned the following functions of hypothesis;

(i) It is a temporary solution of a problem concerning with some truth which enables an investigator to start his research works.

(ii) It offers a basis in establishing the specifics what to study for and may provide possible solutions to the problem.

(iii) It may lead to formulate another hypothesis.

(iv) A preliminary hypothesis may take the shape of final hypothesis.

(v) Each hypothesis provides the investigator with definite statement which may be objectively tested and accepted or rejected and leads for interpreting results and drawing conclusions that is related to original purpose.

(vi) It delimits field of the investigation.

(vii) It sensitizes the researcher so that he should work selectively, and have very realistic approach to the problem.

(viii) It offers the simple means for collecting evidences for verification.

Importance of a Hypothesis:

(i) Investigator's eyes: Carter V. Good thinks that by guiding the investigator in further investigation hypothesis serves as the investigator's eyes in seeking answers to tentatively adopted generalization.

(ii) Focuses research: Without hypothesis, a research is unfocussed research and remains like a random empirical wandering. Hypothesis serves as necessary link between theory and the investigation.

(iii) Clear and specific goals: A well thought out set of hypothesis places clear and specific goals before the research worker and provides him with a basis for selecting sample and research procedure to meet these goals.

(iv) Links together: According to Barr and Scates, "It serves the important function of linking together related facts and information and organizing them into wholes."

(v) Prevents blind research: In the words of P.V. Young, "The use of hypothesis prevents a blind search and indiscriminate gathering of masses of data which may later prove irrelevant to the problem under study."

(vi) Guiding Light: "A hypothesis serves as powerful beacon that lights the way for the research work."

(vii) It provides direction to research and prevent the review of irrelevant literature and the collection of useful or excess data.

(viii) It sensitizes the investigator certain aspects of situation which are irrelevant from the standpoint of problem at hand.

(ix) It enables the investigator to understand with greater clarity his problem and its ramification.

(x) It is an indispensible research instrument, for it builds a bridge between the problem and the location of empirical evidence that may solve the problem.

(xi) It provides the investigator with the most efficient instrument for exploring and explaining the unknown facts.

(xii) It provides a frame work for drawing conclusion.

(xiii) It stimulates the investigator for further research.

Forms of Hypothesis:

According to Bruce W. Tuckman following are the forms of hypothesis;

(i) Question form:

A hypothesis stated as a question represents the simplest level of empirical observation. It fails to fit most definitions of hypothesis. It frequently appears in the list. There are cases of simple investigation which can be adequately implemented by raising a question, rather than dichotomizing the hypothesis forms into acceptable / reject able categories.

(ii) Declarative Statement :

A hypothesis developed as a declarative statement provides an anticipated relationship or difference between variables. Such a hypothesis developer has examined existing evidence which led him to believe that a difference may be anticipated as additional evidence. It is merely a declaration of the independent variables effect on the criterion variable.

(iii) Directional Hypothesis :

A directional hypothesis connotes an expected direction in the relationship or difference between variables. This type of hypothesis developer appears more certain of anticipated evidence. If seeking a tenable hypothesis is the general interest of the researcher, this hypothesis is less safe than the others because it reveals two possible conditions. First that the problem of seeking relationship between variables is so obvious that additional evidence is scarcely needed. Secondly, researcher has examined the variables very thoroughly and the available evidence supports the statement of a particular anticipated outcome.

(iv) Non -Directional Hypothesis or Null Hypothesis:

This hypothesis is stated in the null form which is an assertion that no relationship or no difference exists between or among the variables. Null hypothesis is a statistical hypothesis testable within the framework of probability theory. It is a non-directional form of hypothesis. There is a trend to employ or develop null hypothesis in research in most of the disciplines. A null hypothesis tentatively states that on the basis of evidence tested there is no difference. If the null hypothesis is rejected, there is a difference but we do not know the alternative or the differences. In this the researcher has not to anticipate or give the rational for the declaration or directional form. It does not make researcher biased or prejudiced. He may be objective about the expected outcomes of the research or findings. Actually this is a statistical hypothesis which is self- explanatory. Null hypothesis means zero hypotheses. A researcher has not to do anything in developing it. While research hypothesis is second step in the process of reflective thinking.

A null hypothesis in an appropriate form is order to accommodate the object of inquiry for extracting this information. It does not necessarily reflect the expectations of the researcher so much as the utility of the null form as the best fitted to the logic of chance in statistical knowledge or science.

It is the no difference form, i.e. there is no difference or relationship between or among variables under certain conditions.

Statistical tests of significance are used to accept and reject the null hypothesis. If it is rejected, the general hypothesis is accepted.

Non-directional hypothesis is known as null hypothesis because it ‘nullifies’ the positive argument of the findings or non-directional statement of the generalization. It is also termed as statistical or zero hypothesis because it denies the existence of any systematic principles apart from the effect of chance. It assumes that none or zero difference exists between the two population means or the treatments.

Formulation of Testable Hypothesis:

A hypothesis is a tentative assumption drawn from knowledge and theory. It is used as a guide in the investigation of other facts and theory that are as yet unknown. Its formulation is one of the most difficult and most crucial step in the entire scientific process. A poorly chosen or poorly worded hypothesis can prevent the following:

(i) The obtaining of enough pertinent data,
(ii) The drawing of conclusions and generalizations ,and
(iii) The application of certain statistical measures in the analysis of the result.

Hypothesis is the central core of study that directs the selection of the data to be gathered, the experimental design, the statistical analysis and the conclusions drawn from the study.

A study may be devoted to the testing of one major hypothesis, a number of subsidiary hypothesis, or both major and subsidiary hypotheses. When several hypotheses are used, each should be stated separately in order to anticipate the type of analysis required and in order to definitely accept or reject each hypothesis on its own merit. Irrespective of number or type used each hypothesis should be testable and based upon a logical foundation.

Fundamental Basis of Hypothesis:

The researcher deals with reality on two levels;

1. The Operational Level:

On the operational level researcher must define events in observable terms in order to operate with the reality necessary to do researches.

2. The Conceptual Level:

On the conceptual level the researcher must define events in terms of underlying communality with other events. Defining at a conceptual level, the researcher can abstract from single specific to general instance and begin to understand how phenomena operate and variables interrelate. The formulation of a hypothesis very frequently requires going from an operational or concrete level to the conceptual or abstract level. This movement to the conceptual level enables the result to be generalized beyond the specific conditions of a particular study and thus to be of wider applicability.

Research requires the ability to move from the operational to the conceptual level and vice-versa. This ability is required not only in constructing experiments but in applying their findings as well. The process of making conceptual contrasts between operational programme is called conceptualization or depersonalization.

Difficulties in the Formulation of Useful Hypothesis:

Moving from the operational to the conceptual level and vice -versa is a critical ingredient of the research to demonstration process. The following are the difficulties in the formulation of hypothesis:

1. Absence of knowledge of a clear theoretical framework.
2. Lack of ability to make use of the theoretical framework logically.
3. Lack of acquaintance with available research technique resulting in failure to be able to phrase the hypothesis properly.

X. THE ROLE OF LITERATURE REVIEW

The Review of related literature involves the systematic identification, location, and analysis of documents containing information related to the research problem.

There are four steps involved in conducting a literature review:

1. Searching for the existing literature in your area of study.
2. Reviewing the selected literature.
3. Developing a theoretical framework.
4. Developing a conceptual framework.

There are three sources that you can use to prepare a bibliography:

(a) books;

(b) journals;
(c) the Internet.

The term is also used to describe the written component of a research plan or report that discusses the reviewed documents. These documents can include:

- articles,
- abstracts,
- reviews,
- monographs, -
- dissertations,
- other research reports,
- and electronic media.

The literature review has several important purposes that make it well worth the time and effort. The major purpose of reviewing the literature is to determine what has already been done that relates to your topic.

This knowledge not only prevents you from unintentionally duplicating another person's research, it also gives you the understanding and insight you need to place your topic within a logical frame.

Put simply, the review tells you what has been done and what needs to be done.

Previous studies can provide the rationale for your research hypothesis, and indications of what to be done can help you justify the significance of your study.

In summary, a literature review has the following functions:

• It provides a theoretical background to your study.

• It helps you establish the links between what you are proposing to examine and what has already been studied.

• It enables you to show how your findings have contributed to the existing body of knowledge

in your profession. It helps you to integrate your research findings into the existing body of knowledge.

In relation to your own study, the literature review can help in four ways. It can:

1 bring clarity and focus to your research problem;

2 improve your research methodology;

3 broaden your knowledge base in your research area; and

4 contextualize your findings.

Another important purpose of reviewing the literature is to discover research strategies and specific data collection approaches that have or have not been productive in investigations of topics similar to yours. This information will help you avoid other researchers' mistakes and profit from their experiences. It may suggest approaches and procedures that you previously had not considered.

The following general guidelines, however, can assist you:

• *Avoid the temptation to include everything you find in your literature review*,

Bigger does not mean better. A smaller, well-organized review is definitely preferred to a review containing many studies that are more or less related to the problem.

• *When investigating a heavily researched area, review only those works that are directly related to your specific problem.*

You'll find plenty of references and should not have to rely on less-related studies.

• *When investigating a new or little-researched problem area, review any study related in some meaningful way to your problem.*

You'll need to gather enough information to develop a logical framework for the study and a sound rationale for the research hypothesis.

A common misconception among beginning researchers is that the worth of a topic is a function of the amount of literature available on it. This is not the case. For many new and important areas of research, few studies have been published; the effects of high-stakes testing is one such area. The very lack of such research often increases the worth of its study. On the other hand, the fact that a thousand studies have already been done in a given problem area does not mean there is no further need for research in that area. Such an area will generally be very well developed, and subtopics that need additional research will be readily identifiable.

Understanding the Paradigm in Educational Research

Paradigm in research

What is a paradigm?

Intellectual perception or view, accepted by an individual or a society as a clear example, model, or pattern of how things work in the world. This term was used first by the US science theorist & historian Thomas Kuhn (1922-96) in his 1962 book "The Structure Of Scientific Revolution" to refer to theoretical frameworks within which all scientific thinking and practices operate.

Paradigm in research

Intellectual perception or view, accepted by an individual or a society as a clear example, model, or pattern of how things work in the world. This term was used first by the US science theorist & historian Thomas Kuhn (1922-96) in his 1962 book "*The Structure of Scientific Revolution*" to refer to theoretical frameworks within which all scientific thinking and practices operate.

- Ontology: What is reality?
- Epistemology: What and how can I know reality/knowledge?
- Theoretical perspective: What approach can we use to get knowledge?
- Methodology: What procedure can we use to acquire knowledge?
- Method: What tools can we use to acquire knowledge?
- Sources: What data can we collect?

XI. SAMPLING

A survey may be conducted by either of two methods

1. Census Method or Parametric method and
2. Sampling method or Non-parametric method.

1. Census method:

It deals with the investigation of the entire population. Here the data are collected for each and every unit of the universe. This method provides more accurate and exact information as no unit is left out.

2. Sampling method:

Here a small group is selected as representative of the whole universe. It works with the objective to obtain accurate and reliable information about the universe with minimum of cost, time and energy and to set out the limits of accuracy of such estimates. It makes

exhaustive and intensive study possible with much less time, money and material. Its more popular in research work.

Population:

Population or universe means, the entire mass of observations, which is the parent group from which a sample is to be formed. The term population or universe conveys a different meaning than a traditional one. In census survey, the count of individuals (men, women and children) is known as population.

But in Research Methodology population means characteristics of a specific group. For example secondary school teachers of, who have some specific features like teaching experience, teaching attitudes etc. Sampling means selecting a given number of subjects from a defined population as representative of that population.

One type of population distinguished by educational researchers is called the target population. By target population distinguished by educational researchers is called the target population.

By target population, also called universe, we mean all the members of a real or hypothetical set of people , events or objects to which we wish to generalize the results of our research.

The first step in sampling is to define the target population.

Research work is guided by inductive thinking. The researcher proceeds from specificity to generality. The sample observation is the specific situation, which is applied to the population, it is the general situation.

The measures of a sample are known as statistics and measures of a population are termed as parameter. Mean, S.D., coefficient of Correlation of sample observation known as Statistics and Mean, S.D., coefficient of correlation of population are known as parameters. Generally parameters are estimated on the basis of sample statistics.

Sampling is indispensable technique in behavioral research and not so common in physical sciences. It is fundamental to all statistical methodology of behavioral and social research. It makes research findings economical and accurate. Sampling means selection of individuals from the population in such a way that every individual has equal chance to be taken into the sample.

Term sample should be reserved for a set of units or portion of an aggregate of material which has been selected in the belief that it will be representative of the whole aggregate.

By Frank Yates “Sample is set of units of an aggregate.”

Assumptions of Sampling:

1. Homogeneity amidst complexity:

Social phenomenon is very complex in nature and every unit appears to be different from another. But at the same time they also possess similarities in many respects. It is, therefore, assumed that there is the possibility of such representative types in the whole population that makes sampling possible.

2. Possibility of Representative Selection:

Sampling has its origin in the mathematical theory of probability and law of statistical regularity. The law of statistical regularity lays down that a group of objects chosen at random from a large group tend to possess the characteristics of that large group (universe) by L R. Conner.

3. Absolute accuracy not essential but relative or significant accuracy i.e. needed in case of large scale observations. Because it is practically impossible to achieve because of errors in measurement, collection of data , its analysis, interpretation.

Definition:

"A statistical sample is a miniature picture or cross -section of the entire group or aggregate from which the sample is taken." P. Y. Young

A sample is a small proportion of a population selected for observation and analysis .It is a collection consisting of a part or sub-set of the objects or individuals of population which is selected for the express purpose of representing the population. By observing the characteristics of the sample, one can make certain inferences about characteristics of the population from which it is drawn.

Sampling,"lt is the process of selecting a sample from the population. For this purpose, the population is divided into a number of parts called sampling units." Sampling designs means the joint procedure of selection and estimation. Sampling is a part of the strategy of research.

Sampling should be such that the error of estimation is minimum.

Good and Hatt, "A sample as the name implies, is a smaller representation of a larger whole."

W. G. Cocharn, "In every branch of science we lack the resources, to study more than a fragment of the phenomenon that might advance our knowledge." i.e. fragment is sample and phenomenon is population. The sample observations are applied to the phenomenon i.e. generalization.

David S. Fox, "In the social sciences, it is not possible to collect data from every respondent relevant to our study but only from some fractional part of the respondents. The process of selecting the fractional part is called sampling."

Need of Sampling:

1. Economy of time.
2. Economy of money.
3. True detailed knowledge.
4. Utility in experimental study.
5. It has reliability because it is based on probability theory.

Advantages of Sampling:

1. It has a greater adaptability.
2. It is an economical technique.
3. It has high speed for generalization.
4. According to W.G. Cocharan, "It has greater precision and accuracy in the observation".
5. This technique has great accuracy.
6. It has a greater speed in conducting a research work.
7. It has a greater scope in the field of research.
8. It reduces the cost of observation or data collection.

Disadvantages or Limitation of Sampling:

1. Scope of biasness. (Less accuracy)
2. Problem of representative sample-Difficulty in selecting a truly representative sample.
3. Need of eligible researchers.
4. Instability of sample subjects or changeability of units i.e. in heterogeneous population.
5. There are certain situations where sampling is possible.

Essentials of an Ideal Sample:

> Homogeneity: The units included in sample must be as likeness with other units.
> Adequacy: A sample having 10% of the whole data is adequate.
> Independence: Every unit should be free to be included in the sample.
> Representativeness; An ideal sample must be such that it represents the whole data adequately.

In the number of units included in a sample should be sufficient to enable derivation of conclusions applicable to the whole data.

Economical in terms of time and money. High level of reliability.

Characteristics of a Good Sample:

1. A good sample is the true representative of the population corresponding to its properties.
2. The population is known as aggregate of certain properties and sample is called sub-aggregate of the universe.
3. A good sample is free from bias; the sample does not permit prejudices, the learning and pre-conception, imaginations of the investigator to influence its choice.
4. A good sample is an objective one; it refers objectivity in selecting procedure or absence of subjective elements from the situation.
5. A good sample maintains accuracy .It yields an accurate estimates or statistics and does not involve errors.
6. A good sample is comprehensive in nature. This feature of a closely linked with true-representativeness. Comprehensiveness is a quality of a sample which is controlled by specific purpose of the investigation. A sample may be comprehensive in traits but may not be a good representative of the population.
7. A good sample has the practicability for research.

XII. QUANTITATIVE AND QUALITATIVE PARADIGM IN RESEARCH

Quantitative:

Quantitative research: According to Creswell, "Quantitative research attempts to quantify, collect and analyze numerical data, and focus on the links among a smaller number of attributes across many cases. Post positivist worldview, experimental design, and pretest and posttest measures of attitudes. In this scenario, the researcher tests a theory by specifying narrow hypotheses and the collection of data to support or refute the hypotheses". (John W. Creswell, *Research Design Qualitative, Quantitative, And Mixed Method Approaches*, SAGE Publications, 2013)

According to Dörnyei, the main characteristic of quantitative researches are:

Using numbers: The single most important feature of quantitative research is, naturally, that it is centered around numbers.

A priori categorization: Because the use of numbers already dominates the data collection phase, the work required to specify the categories and values needs to be done prior to the actual study. (Zoltán Dörnyei, *Research Methods in Applied Linguistics*, Oxford University Press, 2007)

Variables rather than cases: quantitative researchers are less interested in individuals than in the common features of groups of people. QUAN research is centered around the study of variables that capture common features and which are quantified by counting, scaling, or by assigning values to categorical data. Statistics and the language of statistics This is undoubtedly the most salient QUAN feature. statistical analyses can range from calculating the average (or as it is referred to in statistics, the "mean") of several figures on a pocket calculator to running complex multivariate analyses on a computer.

Qualitative:

According to Cresswell "A qualitative study is defined as an inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting".

Denzin and Lincoln define qualitative research:

Qualitative research is approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials case study, personal experience, introspective, life story interview, observational, historical, interactional, and visual texts- that describe routine and problematic moments and meaning in individuals' lives. Multi-method in focus, involving an interpretive, naturalistic. (N.K. Denzin & Y.S. Lincoln, *Handbook of qualitative research* Thousand, Oaks, CA: Sage 2005.)

Characteristics of Qualitative Research

An exploratory and Descriptive focus
Emergent Design
Data Collection in the natural setting
Emphasis on 'human-as-instrument'
Qualitative methods of data collection
Early and On-going inductive analysis

Cresswell divides qualitative research into five (5) main Qualitative Research Types and identifies the key challenges of each mode of inquiry.

The Biography
Phenomenology
Grounded Theory
Ethnography
Case Study

Tools of Data Collection

A researcher requires many data - gathering tools or techniques. Tests are the tools of measurement and it guides the researcher in data collection and also in evaluation. Tools may vary in complexity,

interpretation, design and administration. Each tool is suitable for the collection of certain type of information.

One has to select from the available tools those which will provide data he seeks for testing hypothesis. It may happen that existing research tools do not suit the purpose in some situation, so researcher should modify them or construct his own.

Research Design and Methodology

A research proposal is a document proposing a research project, generally in the sciences or academia, and generally constitutes a request for sponsorship of that research. Proposals are evaluated on the cost and potential impact of the proposed research, and on the soundness of the proposed plan for carrying it out.

Varieties of research design and methodology

Question type	Question	Examples
Exploratory questions	What is the case? What are the key factors?	**What are the critical success factors of a profitable company?** **What are the distinguishing features of a good leader?** **What are the reasons for the carnage on South African roads?**
Descriptive questions	How many? What is the incidence of x? Are x and y related?	**How many people died of AIDS in South Africa last year?** **Is there a correlation between parental support and scholastic achievement?**
Causal questions	Why? What are the causes of y?	**What are the main causes of malnutrition in a rural community?** **Is smoking the main cause of lung cancer?**
Evaluative questions	What was the outcome of x? Has P been successful?	**Has the new TB awareness programme produced a decline in reportable TB cases?** **Has the introduction of a new refrigeration technology led to more cost-effective production?**
Predictive questions	What will the effect of x be on y?	**What effect will the introduction of a new antibiotic have on population P?**
Historical questions	**What led to y happening?** **What were the events that led up to y?** **What caused y?**	**What caused the demise of socialism in Central Europe during the late eighties?** **What led NATO countries to decide to start aerial bombing of Kosovo?**

Description and preparation of research tools/instruments

Different tools used for data collection may be;
Questionnaires
Interviews
Schedules
Observation Techniques
Rating Scales

1. Questionnaire

It is list of questions related to one topic. It may be defined as;

"A questionnaire is a systematic compilation of questions that are submitted to a sampling of population from which information is desired." *Barr, Davis & Johnson* (1953). Educational research and appraisal. New York J.B. Lippincott Company

"In general, the word questionnaire refers to a device for securing answers to questions by using a form which the respondent fills in himself." (Goode, W., and P. Hatt. 1962.*Methods in Social Research* New York: McGraw-Hill.)

The questionnaire is probably most used and most abused of the data gathering devices .It is easy to prepare and to administer.

The questionnaire is a form prepared and distributed to secure responses to certain questions. It is a device for securing answers to questions by using a form which the respondent will fill by himself.

It is a systematic compilation of questions. It is an important instrument being used to gather information from widely scattered sources. Normally used where one cannot see personally all of the people from whom he desires responses or where there is no particular reason to see them personally.

Characteristics of a Good Questionnaire:

1. It deals with an important or significant topic.
2. Its significance is carefully stated on the questionnaire itself or on its covering letter.
3. It seeks only that data which cannot be obtained from the resources like books, reports and records.
4. It is as short as possible, only long enough to get the essential data.
5. It is attractive in appearance, nearly arranged and clearly duplicated or printed.
6. Directions are clear and complete, important terms are clarified.
7. The questions are objective, with no clues, hints or suggestions.
8. Questions are presented in a order from simple to complex.
9. Double negatives, adverbs and descriptive adjectives are avoided.
10. Double barreled questions or putting two questions in one question are also avoided.
11. The questions carry adequate number of alternatives.
12. It is easy to tabulate, summarize and interpret.

Merits of Questionnaire Method:

1. it's very economical.
2. It's a time saving process.
3. It covers the research in wide area.
4. It's very suitable for special type of responses.
5. It is most reliable in special cases.

Demerits of Questionnaire Method:

1. Through this we get only limited responses.
2. Lack of personal contact.
3. Greater possibility of wrong answers.
4. Chances of receiving incomplete response are more.
5. Sometimes answers may be illegible.
6. It may be useless in many problems.

2. Interview

Interview is a two way method which permits an exchange of ideas and information.

"Interviewing is fundamentally a process of social interaction." *W. J. Goode & P.K. Hatt*

"The interview constitutes a social situation between two persons, the psychological process involved requiring both individuals mutually respond though the social research purpose of the interview call for a varied response from the two parties concerned." (Vivien Palmar, *Field Studies in Sociology: A Student's Manual, Chicago University Press, 1928*).

In an interview a rapport is established between the interviewer and the interviewee. Not only is physical distance between them annihilated, the social and cultural barrier is also removed; and a free mutual flow of ideas to and fro takes place. Both create their respective impression upon each other.

Difference between Interview and Questionnaire

Questionnaire Method	Interview Method
1. Data is gathered indirectly. 2. No face to face contact between two. 3. Interviewer should have the general knowledge of the topic. 4. Interviwee will hesitate to write it. 5. We get written information only.	1. Data is gathered directly. 2. There is face to face contact between interviewer and interviewee. 3. Skillful interviewer is needed. 4. Some confidential information can also be obtained. 5. We get written and oral both type of information.

3. Schedule

When a researcher is using a set of questionnaires for interview purpose it is known as schedule.

"Schedule is the name usually applied to set of questions, which are asked and filled by an interviewer in a face to face situation with another." *W.J. Goode & P. K. Hatt*

According to *Thomas Carson*, "The schedule is nothing more than a list of questions which, it seems necessary to test the hypothesis."

4. Observation techniques

This is most commonly used technique of evaluation research. It is used for evaluating cognitive and non-cognitive aspects of a person. It is used in evaluation performance, interests, attitudes, values towards their life problems and situations. It is most useful technique for evaluating the behaviors of children.

It is technique of evaluation in which behavior are observed in a natural situations.

"It is thorough study based on visual observation. Under this technique group behaviours and social institutions problems are evaluated." *C. Y. Younge*

"Observation employs relatively more visual and senses than audio and vocal organs." *C.A. Mourse*

The cause- effect relationship and study of events in original form, is known as observation.

5. Rating Scale

Ratting is term applied to express opinion or judgment regarding some situation, object or character. Opinions are usually expressed on a scale of values; rating techniques are devices by which such judgments may be quantified.

"Rating is an essence and direct observation." *Ruth Strong*

"A rating scale ascertains the degree, intensity and frequency of a variable." V*on Dallen*

Rating techniques are more commonly used in scaling traits and attributes. A rating method is a method by which one systematizes, the expression of opinion concerning a trait. The rating is done by parents, teachers, a board of interviewers and judges and even by the self as well.

XIII. DATA ANALYSIS

Data analysis embraces a whole range of activities of both the qualitative and quantitative type. It is usual tendency in behavioral research that much use of quantative analysis is made and statistical methods and techniques are employed. The statistical methods and techniques are employed. The statistical methods and techniques have got a special position in research because they provide answers to the problems.

Kaul defines data analysis as, "Studying the organized material in order to discover inherent facts. The data are studied from as many angles as possible to explore the new facts."

Purpose:

The following are the main purposes of data analysis:

(i) Description:

It involves a set of activities that are as essential first step in the development of most fields. A researcher must be able to identify a topic about which much was not known; he must be able to convince others about its importance and must be able to collect data.

(ii) Construction of Measurement Scale:

The researcher should construct a measurement scale. All numbers generated by measuring instruments can be placed into one of four categories:

(a) Nominal: The number serves as nothing more than labels. For example no 1 was not less than no 2 .Similarly no 2 was neither more than no 1 and nor less than no 3.

(b) Ordinal: Such numbers are used to designate an ordering along some dimensions such as from less to more, from small to large, from sooner to later.

(c) Interval: The interval provides more precised information than ordinal one. By this type of measurement the researcher can make exact and meaningful decisions. For example if A,B and C are of 150 cm, 145cm and 140 cm height, the researcher can say that A is 5 cm taller than B and B is 5 cm taller than C.

(d) Ratio Scale: It has two unique characteristics. The intervals between points can be demonstrated to be precisely the same and the scale has a conceptually meaningful zero point.

(iii) Generating empirical relationships:

Another purpose of analysis of data is identification of regularities and relationships among data. The researcher has no clear idea about the relationship which will be found from the collected data. If the data were available in details it will be easier to determine the relationship. The researcher can develop theories if he is able to recognize pattern and order of data. The pattern may be showing association among variables, which may be done by calculating correlation among variables or showing order, precedence or priority. The derivation of empirical laws may be made in the form of simple equations relating one interval or ratio scaled variable to a few others through graph methods.

(iv) Explanation and prediction:

Generally knowledge and research are equated with the identification of causal relationships and all research activities are directed to it. But in many fields the research has not been developed to the level where causal explanation is possible or valid predictions can be made. In such a situation explanation and prediction is construct as enabling the values of one set of variables to be derived given the values of another.

Functions:

The following are the main functions of data analysis:

(i) The researcher should analyze the available data for examining the statement of the problem.

(ii) The researcher should analyze the available data for examining each hypothesis of the problem.

(iii) The researcher should study the original records of the data before data analysis.

(iv) The researcher should analyze the data for thinking about the research problem in lay man's term.

(v) The researcher should analyze the data by attacking it through statistical calculations.

(vi) The researcher should think in terms of significant tables that the available data permits for the analysis of data.

Statistical Calculations:

The researcher will have to use either descriptive statistics or inferential statistics for the purpose of the analysis.

(i) The descriptive statistics may be on any of the following forms:

(a) Measures of Central Tendency:

These measures are mean, median, mode geometric mean and harmonic mean. In behavioral statistics the last two measures are not used. Which of the first three will be used in social statistics depends upon the nature of the problem.

(b) Measures of Variability:

These measures are range, mean deviation, quartile deviation and standard deviation. In social statistics the first two measures are rarely used. The use of standard deviation is very frequently made for the purpose of analysis.

(c) Measures of Relative Position:

These measures are standard scores (Z or T scores), percentiles and percentile ranks .All of them are used in educational statistics for data analysis.

(d) Measures of Relationship:

There measures are Co-efficient of Correlation, partial correlation and multiple correlations. All of them are used in educational statistics for the analysis of data. However the use of rank method is made more in comparison to Karl pearson method.

(ii)The inferential statistics may be in any one of the following forms:

(a) Significance of Difference between Means:

It is used to determine whether a true difference exists between population means of two samples.

(b) Analysis of Variance:

The Z or t tests are used to determine whether there was any significant difference between the means of two random samples. The F test enables the researcher to determine whether the sample means differ from one another to a greater extent then the test scores differ from their own sample means using the F ratio.

(c) Analysis of Co-Variance:

It is an extension of analysis of variance to test the significance of difference between means of final experimental data by taking into account the Correlation between the dependent variable and one or more Co-variates or control variables and by adjusting initial mean differences in the group.

(d) Correlation Methods:

Either of two methods of correlation can be used for the purpose of calculating the significance of the difference between Co-efficient of Correlation.

(e) Chi Square Test:

It is used to estimate the like hood that some factor other than chance accounts to the observed relationship. In this test the expected frequency and observed frequency are used for evaluating Chi Square.

(f) Regression Analysis:

For calculating the probability of occurrence of any phenomenon or for predicting the phenomenon or relationship between different variables regression analysis is cone.

Interpretation of Data

According to F.L Whitney, interpretation means an adequate exposition of the true meaning of the material presented in terms of the purposes of the study being reported and of the chapter and section topic involved.

Purposes:

The following are the main purposes of interpretation of data or results;

(i) To throw light on the real significance of the material in the context.

(ii) To understand implications of the data.

(iii) To provide hints of conclusions and recommendations of the researcher.

(iv) To show the values of greatest worth that has resulted from the research.

(v) To refer important generalization.

Factors:

The researcher should keep the following factors in consideration in interpretation of data;

(i) Not to ignore those factors which are unstudied:

In social / behavioral researches there are many factors which have their impact upon the findings of the research but no researcher is in the position to study all the factors. Naturally he does not take into account in interpretation of the results those factors which have not been studied. It has its effect upon the search of truth. Thus the researcher should take into consideration such factors in his interpretation. For example if a comparison has been made between the traditional method of teaching and any modern method of teaching in respect of effectiveness of teaching, the interpretation that successful attainment is the result of method of teaching only is complete denial of the role of general mental ability, high achievement motivation and better study habits etc.

(ii) Not to ignore those factors which have not been selected for study:

In social / behavioral researches, the subjects are generally so large that the researcher collects the data from a selected group only. The researcher should remember that some factors which have not been included in selective group are equally important in their impact upon findings. For example if the researcher collects data from a particular school in a particular area and then he concludes about all the schools/colleges.

(iii) Not to over -interpret the expected results:

The researcher should remember that even if he finds the findings of the research as per his expectations he should not interpret more than what can be interpreted on the basis of

data available. The researcher should be cautious that he reports all such factors which might be responsible for the findings.

(iv) Not to exercise defense mechanism in interpreting the results:

The researcher should remember that it is not necessary that the hypotheses should always be confirmed. It is possible that the researcher may exercise defense mechanism if the results of the study are not found as per expectations of the research. In such a situation he should not try to find faults in tools or samples for the results against his expectations. If any researcher tries to do so, his interpretation will not be considered fair. The hypotheses are made in the beginning of the research when the knowledge of the researcher about the problem is very limited. Agreement between the tentative and the results is not necessary.

XIV. TYPES OF RESEARCH

The different kinds of questions which instigate research require approaches to research that are distinguished by their theoretical background and methodologies.

Major Types of Research: 1 Historical; 2 Comparative; 3 Descriptive; 4 Correlation; 5 Experimental; 6 Evaluation; 7 Action; 8 Ethnogenic; 9 Feminist; 10 Cultural

Historical Research

It has been defined as the systematic and objective location, evaluation and synthesis of evidence in order to establish facts and draw conclusions about past events. It involves exploring the meaning and relationship of events, and as its resource it uses primary historical data in the form of historic artefacts, records and writings.It attempts to find out what happened in the past and to reveal reasons for why and how things happened. An interesting aspect of the values of historical research, is the relationship the past can have with the present and even the future.

Historical evidence, consisting of primary historical data, must be scrutinized from two points of view.

The first is to ascertain whether the artefact or document to be studied is genuine. There have been many mistakes made in the past, either through a lack of analytical rigour by over-enthusiastic researchers, or through fraud.

The second is to examine, in written evidence in the form of historic documents etc., the authenticity of the contents.

What is the meaning of what is written, and how accurate is it? For example, many authentic medieval texts are known to be wildly inaccurate and vague in their descriptions of events.

Aspects of historical research that determine scope

1. Where the events took place.
2 Which people were involved.
3 When the events occurred.
4 What kind of human activity was involved.

It must be remembered that the mere collection of historic facts, or the setting up of chronologies of events, does not constitute research. Although these are a necessary part of historical research, an interpretation of the meanings and an assessment of the significance of the events are required.

The problem for historians tends to be the paucity of information, while scientists are often overwhelmed by it! All research students, whatever their chosen field of study, have to undertake a review of the literature. This is a study of what has been done and written in the past, and so the principles of historical research can be seen to be of direct relevance to this part of their work.

Comparative Research

It is often used together with historical research. Researchers compare people's experience of different societies, either between times in the past or in parallel situations in the present.

It is often easier to understand phenomena when they are compared with similar phenomena from another time or place. Culture and society rely heavily on what has gone before and often use references from the past to justify the present. Eg., The constitution, the tax system, social roles are all rooted in their own histories.

Similarly, place also determines that phenomena develop differently. The study and comparison of differences help to reveal the origins and development of social phenomena, locating them in a certain time and place, and thus defeating claims that they are universal and a temporal.

Many social theories are presented as if the generalizations that they embody are valid for all times and places, when in fact they were arrived at on the basis of limited contemporary experience. We can also learn by making comparisons both with the past and with experiences elsewhere.

Descriptive Research

Instead of examining record or artefacts, descriptive research relies on observation as a means of collecting data. It attempts to examine situations in order to establish what is the norm, i.e. what can be predicted to happen again under the same circumstances.

'Observation' can take many forms.

Depending on the type of information sought, people can be interviewed, questionnaires distributed, visual records made, even sounds and smells recorded. The important point is that the observations are written down or recorded in some way, in order that they can be subsequently analyzed. It is important that the data so collected are organized and presented in a clear and systematic way, so that the analysis can result in valid and accurate conclusions.

The scale of the research is influenced by two major factors:

1. The level of complexity of the survey.
2. The scope of the survey.

Correlation Research

The information sought in this research is expressed not in the form of artefacts, words or observations, but in numbers.While historical and descriptive approaches are predominantly forms of qualitative research, analytical survey or correlation research is principally quantitative.

'Correlation' is another word to describe the measure of association or the relationships between two phenomena. In order to find meaning in the numerical data, the techniques of statistics are used. What kind of statistical tests are used to analyze the data depends very much on the nature of the data. This form of quantitative research can be broadly classified into two types of studies:

1. Relational studies.
2. Prediction studies.

The Relational Studies is an investigation of possible relationships between phenomena to establish if a correlation exists and, if so, its extent. This exploratory form of research is carried out particularly where little or no previous work has been done, and its outcomes can form the basis for further investigations.

Prediction studies tend to be carried out in research areas where correlations are already known. This knowledge is used to predict possible future behavior or events, on the basis

that if there has been a strong relationship between two or more characteristics or events in the past, then these should exist in similar circumstances in the future, leading to predictable outcomes.

Experimental Research

Experimental research differs from the other research approaches noted above through its greater control over the objects of its study. The researcher strives to isolate and control every relevant condition that determines the events investigated, so as to observe the effects when the conditions are manipulated. Chemical experiments in a laboratory represent one of the purest forms of this research type

An experiment involves making a change in the value of one variable – (called the independent variable) – and observing the effect of that change on another variable – (called the dependent variable).

Thus, the most important characteristic of the experimental approach is that it deals with the phenomenon of 'cause and effect',

Not all experimental research has to, or even can, take place in a laboratory.

The experimental methods used must take account of how much it is possible to control the variables.

Classes of Experiments

1 Pre-experimental.
2 True experimental.
3 Quasi-experimental.
4 Correlation and ex post facto.

Pre-experimental designs are unreliable and primitive experimental methods in which assumptions are made despite the lack of essential control of variables. An example of this is the supposition that, faced with the same stimulus, all samples will behave identically to the one tested, despite possible differences between the samples.

True experimental designs are those that rigorously check the identical nature of the groups before testing the influence of a variable on a sample of them in control-led circumstances. Parallel tests are made on identical samples (control samples) which are not subjected to the variable.

In quasi-experimental designs, not all of the conditions of true experimental design can be fulfilled. The nature of the shortcomings is however recognized, and steps are taken to minimize them or predict a level of reliability of the results. The most common case is when a group is tested for the influence of a variable and compared with a non-identical group with known differences (control group) which has not been subjected to the variable.

Correlation design looks for cause and effect relationships between two sets of data, while ex post facto designs turn experimentation into reverse, and attempt to interpret the nature of the cause of a phenomenon by the observed effects. Both of these forms of research result in conclusions which are difficult to prove and they rely heavily on logic and inference.

Evaluation Research

This is a descriptive type of research specifically designed to deal with complex social issues. It aims to move beyond 'just getting the facts' in order to make sense of the myriad human, political, social, cultural and contextual elements involved.

There are a range of different approaches or evaluation models. Two of them are systems analysis and responsive evaluation.

Systems analysis: is a holistic type of research, which reverses the three-stage order of thinking which is typical of scientific enquiry:

1. breaking the problem or phenomenon to be investigated down into researchable parts,
2.then separately evaluating the parts,
3. and finally aggregating these evaluations into an explanation of the whole.

Systems analysis lends itself to creating understanding in complicated situations, particularly those involving people and organizations; such problems are often referred to as 'messes' because of their indeterminate nature and large number of interconnected variables. Modelling and diagramming are two of the principal techniques used to describe systems.

In the responsive evaluation model a series of investigative steps is undertaken in order to evaluate how responsive a programme is (e.g. an advertising campaign, a new degree course or an experimental traffic scheme) to all those taking part in it.

Steps in Responsive Evaluation

•Data collection: identifying issues from the people directly involved in the programme; identifying further issues from the programme documents; observing how the programme is actually working.

•Evaluation: the design of an evaluation based on the data collected and reporting findings.

•Suggesting changes: informing the participants of the findings in ways specifically designed for each type of audience.

A common purpose of evaluation research is to examine programmes or the working of projects from the point of view of levels of awareness, costs and benefits, cost-effectiveness, attainment of objectives and quality assurance.

Action Research

This can be seen as related to experimental research, though it is carried out in the real world rather than in the context of a closed experimental system.

A basic definition of this type of research is:

'a small scale intervention in the functioning of the real world and a close examination of the effects of such an intervention' (Cohen and Manion," Research Methods in Education", 2012, p. 186).

Its main characteristic is that it is essentially an 'on the spot' procedure, principally designed to deal with a specific problem evident in a particular situation. Constant monitoring and evaluation are carried out, and the conclusions from the findings are applied immediately, and further monitored.

Action research depends mainly on observation and behavioural data.

Ethnogenic Research

In this approach, the researcher is interested in how the subjects of the research theorise about their own behaviour rather than imposing a theory from outside. The test of success is that the subjects themselves recognise the description of familiar features of their culture.

The ethnogenic approach has three characteristic features:

1. it aims to represent a view of the world as it is structured by the participants under observation by eliciting phenomenological data;
2. it takes place in the undisturbed natural settings of the subjects;
3. and it attempts to represent the totality of the social, cultural and economic situation, regarding the context to be equally important as the action

This is a difficult form of research for several reasons.

As so much of culture is hidden and rarely made explicit, the data being sought by the researcher need to be pursued by delving deep into the language and behaviour of the subjects of the study, and of the surrounding conditions in which they live.

When working in a naturalistic setting, with social groups engaged in everyday activities, it is impossible to repeat the situation in order to verify the research.

Social reality is not stable: a thing never 'is', as it is always changing into something else.

It is therefore of great importance that multi-method and confirmatory data sources are used to capture the moment.

Feminist Method

Feminist research is a particular model of social research which involves theory and analysis that highlight the differences between men's and women's lives. It claims that researchers who ignore these differences have invalid knowledge, as non-feminist paradigms usually ignore the partiality of researchers' ideas about the social world.

Value neutrality is impossible as no researcher practises research outside his or her system of values and no methods of social science can guarantee that knowledge is originated independently of values.

No specific methods are seen to be particularly feminist, but the methodology used is informed by theories of gender relations. However, feminist research is undertaken with a political commitment to the identification and transformation of gender relations. This tends to reveal that this form of research is not uniquely political, but rather exposes all methods of social research to be political.

Cultural Research

Many of the prevailing theoretical debates (e.g. postmodernism, post-structuralism) are concerned with the subjects of language and cultural interpretation, with the result that these issues have frequently become central to sociological studies.

The need has therefore arisen for methodologies that allow analysis of cultural texts to be compared, replicated, disproved and generalised.

From the late 1950s, language has been analysed from several basic viewpoints:

-the structural properties of language,

-language as an action in its contextual environment, and

-sociolinguistics and the 'ethnography of speaking'.

The meaning of the term 'cultural texts' has been broadened from that of purely literary works to that of the many manifestations of cultural exchange, be they formal such as TV news programmes, official parties etc., or informal such as how people dress or converse. The main criterion for cultural texts is that one should be able to 'read' some meanings into the phenomena. Texts can therefore include tactile, visual and aural aspects.

Three approaches to the consistent interpretation of cultural texts can be mentioned here briefly:

- content analysis,
- semiotics and
- discourse analysis.

Content analysis was developed from the mid 1900s, chiefly in America, and is a rather positivistic attempt to apply order to the subjective domain of cultural meaning.

A quantitative approach is taken by counting the frequency of phenomena within a case in order to gauge its importance in comparison with other cases.

Much importance is given to careful sampling and rigorous categorisation and coding in order to achieve a level of objectivity,

reliability and generalisability and the development of theories.

Semiotics takes an almost opposite approach by attempting to gain a deep understanding of meanings by the interpretation of single elements of text rather than to generalize through a quantitative assessment of components.

Words are only meaningful in their relationship with other words,

e.g. we only know the meaning of ‘horse’ if we can compare it with different animals with different features.

Semiotics as a method focuses our attention on to the task of tracing the meanings of things back through the systems

and codes through which they have meaning and make meaning. Discourse analysis studies the way that people communicate with each other through language within a social setting. Language is not seen as a neutral medium for transmitting information; it is bedded in our social situation and helps to create and recreate it.

Language shapes our perception of the world, our attitudes and identities.

While a study of communication can be simply broken down into four elements (sender, message code, receiver and channel), or alternatively into a set of signs with both syntactical (i.e. orderly or systematic) organisation and semantic (i.e. meaningful and significant) relationships, such simplistic analysis does not reflect the power of discourse.

APPENDIX I

CONTENTS IN COMPOSING A PROPOSAL

[STRUCTURE OF THE CHAPTERS]

Preliminary pages:

- ✓ *Title Page (Cover page)*
- ✓ *Table of Contents*
- ✓ Abbreviations (Option)

CHAPTER I

Introduction

✓ Introduce the topic of your study and should be a brief

1.1 Background to the Study

✓ It is a brief overview of the problem/topic/issue the research.

1.2 Statement of the Problem

✓ Clarify what, why and how is the problem

1.3 Aim/Purpose

1.4 Objectives of the Research [what to be achieved at the end]

1.4.1 General Objective

1.4.2 Specific Objectives

1.5 Research Questions/Hypothesis (if any)

1.6 Significance of Research [Contribution, Application, Intervention]

1.7 Scope/Delimitation and Limitations of the Study

1.8 Conceptual Framework

CHAPTER II: LITERATURE REVIEW

- ✓ should address theories, models (where relevant), empirical research, substantive issues, concepts, content and elements of the field in question,
- ✓ insights must be synthesized coherently from relevant literatures related to the research problem,
- ✓ must be focused yet comprehensive in its coverage of relevant issues or must present both sides of an issue or argument,
- ✓ searching for literature on the internet **SHOULD** be sited carefully (**Wikipedia not recommended**)

CHAPTER III: METHODOLOGY

3.1 Research Approach [appropriate & applicable]

✓ Qualitative or Quantitative or Both = Research Triangulation

3.2 Research Design [How is conducted and organized)

3.2.1 Research Areas
3.2.2 Target Population
3.2.3 Sampling Procedures

3.3 Data Collection [Research Instruments]

- ✓ Sources = Can be categorized in terms of *Primary/Secondary sources*

3.3.1 Questionnaires: (can be Closed Ended or Open Ended)
3.3.2 Interviews: Individual: One-on-one/Focused group/Face-to-face/audio
3.3.3 Observation: Check lists, Observation guide driven from the field study

3.4 Validity and Reliability

4.4.1 Validity [Content, Criterion or Construct]
4.4.2 Reliability [Repeated, Single, Internal stability/Consistency]

3.5 Ethical Issue [Consideration]

- ✓ *Informed consent, maintain confidentiality and guarantees anonymity of participants!*

REFERENCES

[Bibliography should be relevant and recent ones]
Order: According to JUCO Typographical Norms (pg. 36)

1. Published Books
2. Articles and Journals
3. Unpublished materials
   - Periodicals
   - Dissertations,
   - Thesis, Class notes…..etc
4. Internet sources (Electronic web sites)
5. Other sources (Interviews; documents…..etc)

IMPORTANT POINTS TO PUT INTO CONSIDERATION

AN ESSAY is a scientific work and should be written according to particular norms prescribed by an Institution: JUCO/SAUT [**Typographical Norms**]

- ✓ RESEARCH refers to a search for knowledge (information) about certain topic (TITLE/THEME).
- ➢ a careful scientific investigation or inquiry through search for new facts from the known to the unknown.
- ✓ In JUCO, students and their supervisors should be faithfully to the **TYPOGRAPHICAL NORMS**
- ✓ For PROPOSALS: Expression of **FUTURE TENSE** (in third chapter) which FINAL REPORT is **PAST TENSE**: should include an Abstract which include: an idea of a topic, aim (rationality), objectives, research questions (hypothesis), methods/approaches used, target population, significant findings, conclusions & recommendations.

DEADLINE OF THE SUBMISSION OF THE PROPOSALS: As indicated in the ALMANAC

- ✓ *The **PROPOSAL** should be written on about **5 to 10** pages depending on topic and competence of the researcher, with **single** line spacing, and using font **Time New Romans**, size **14**. The supervisors have to collect the marking scheme for the research proposal at any time.*
- ✓ *Spacing before and after "0"*
- ✓ *Margins Top-3cm; Left-3cm; Bottom-2,5cm; Right-2,5cm*
- ✓ *Footnotes: Time New Romans, 12.*
- ✓ *Tabulator: 0,7 cm*

APPENDIX II

A GUIDELINE FOR RESEARCHERS & SUPERVISORS

COMPOSING A QUALITY LONG ESSAY

IMPORTANT POINTS TO PUT IN CONSIDERATION

AN ESSAY is a scientific work and should be written according to particular norms prescribed by an Institution: JUCO/SAUT [Typographical Norms]
RESEARCH refers to a search for knowledge (information) about certain topic (TITLE/THEME).
A careful scientific investigation or inquiry through search for new facts from the known to the unknown.
In JUCO, students and their supervisors should be faithfully to the TYPOGRAPHICAL NORMS
For final report: should include an Abstract which include: an idea of a topic, aim (rationality), objectives, research questions (hypothesis), methods/approaches used, target population, significant findings, conclusions & recommendations

A PROPOSAL RESEARCH PAPER [BAED/RS]

[CONTENTS IN COMPOSING AN ESSAY]

CHAPTER I INTRODUCTION

A general idea of the topic (problem) in particular areas of study

1.1 Background of the Research Study [Status Questionis]

- Problematic Aspect(s) of the Research (its sources)
- A coherent magnitude of information (situational facts)

1.2 Statement of the Problem [Theoretical gap = Feasible & Researchable]
What, When, Where, Who, How, Why

1.3 Purpose of the Research [Reasons = Rationale or Why such a topic)
Aim, intention, motive (interest) to choose the topic

1.4 Objectives of the Research [what to be achieved at the end = values]
General Objective/Specific Objectives

1.5 Research Questions/Hypothesis (if any)

1.6 Significance of Research [Contribution, Application, Intervention]

1.7 Scope and Limitations of the Study

CHAPTER II: LITERATURE REVIEW

Summary of Relevant Literatures Related to the Topic Theoretical Insights to be integrated and synthesized coherently

2.1 Conceptual Review / Terms / Definitions üDefinition of key terms
Types or Characteristics, Values, Conditions

2.2 Basic Principles / Conditions / Dimensions

2.3 Theories / Approaches / Models / Empirical Review

Theoretical insights [Developed from arguments]

Empirical review [Derived from hypothesis]

2.4 Causes or Factors or Challenges

Social-cultural causes/factors/challenges uPolitical and economic factors Psychological-physical causes.....etc

2.5 Effects... Strategies... Intervention... Prevention...

Positive Effects (Strength)

Negative Effects (Weaknesses)

[CHAPTER III: RESEARCH DESIGN AND METHODOLOGY]

3.1 Research Approach [appropriate & applicable]

- Qualitative or Quantitative Or Both = Research Triangulation
- Nature of Inquiry and analysis employed in collecting data

3.2 Research Design [How is conducted and organized)

3.2.1 Research Areas (Distribution of Demographic data, situational analysis)

3.2.2 Target Population = Description of Samples [age, gender, status, types]

3.2.3 Sampling Procedures = Techniques used to get such selected population

3.3 Data Collection Procedures [Research Instruments]

Indicate the types of data collected from the field research

Sources = Can be categorized into Primary or Secondary sources

3.3.1 Questionnaires: (Closed Ended or Open Ended)

3.3.2 Interviews: Individual: One-on-one/Focused group/Face-to-face/audio

3.3.3 Observation: Check lists, Observation guide driven from the field survey

3.4 Validity and Reliability of Study [Trust worth of Study]

3.4.1 Validity [Content, Criterion or Construct]

3.4.2 Reliability [Repeated, Single, Internal stability/Consistency]

3.5 Ethical Issue [Consideration] = Informed consent: Assure and maintain confidentiality; *guarantees anonymity of participants!*

CHAPTER IV [DATA ANALYSIS, INTERPRETATION AND DISCUSIONS]

- Data analysis can be based on the research questions by using Statistical Package for Social Science-SPSS, Excel
- Qualitative data can be transcribed, summarized, categorized and finally interpreted according to research Qns or Hypothesis

4.1 Analysis of the Data [Report the Data Collected]

4.1.1 Demographic data /General Information of the respondents

Age... or Sex/Gender.... Experience .... Professional Status..... or Marital Status.... Occupation.... or Type of.....

4.1.2 Challenges/Causes/Factors.....[Respondents' Views] ü Economic factors

Socio-cultural factors ..... etc.

4.2 Interpretation of the Findings [Presentation of the Report]

Justification or confirmation of the research questions

Strategies for Prevention, Interventions ..... etc

4.3 Discussions/Summary of the Findings [Justification of R. Qns]

CHAPTER V CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

- The general arguments derived from discussions
- The final standings (belief) the researcher claims to defend
- Verification of Hypothesis with the findings from Chapter IV
- Answering to Research questions stated in Chapter One
- Writing NEW CONCLUSION deriving from this research

5.2 Recommendations [According to the FINDINGS]

5.2.1 Suggestions for ... e.g. solutions to....

5.2.2 Recommendation for future research study

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Alphabetical and Chronological Arrangement

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   - § Periodicals
   - § Dissertations,
   - § Thesis, Class notes.....etc
4. Internet sources (Electronic web sites)

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