



**T.Y.M.C.A.  
SEMESTER - V (CBCS)**

**RESEARCH METHODOLOGY**

**SUBJECT CODE : MCAILE5052**

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## SYLLABUS

Course Code	Course Name
MCAILE5052	Research Methodology

Sr. No.	Module	Detailed Contents	Hours
<b>1</b>	<b>Introduction and Basic Research Concepts</b>	Research – Definition; Concept of Construct, Postulate, Proposition, Thesis, Hypothesis, Law, Principle. Research methods vs Methodology, Need of Research in Business and Social Sciences, Objectives of Research, Issues and Problems in Research, Characteristics of Research: Systematic, Valid, Verifiable, Empirical and Critical	<b>10</b>
<b>2</b>	<b>Types of Research</b>	Basic Research, Applied Research, Descriptive Research, Analytical Research, Empirical Research, Qualitative and Quantitative Approaches	<b>08</b>
<b>3</b>	<b>Research Design and Sample Design</b>	Research Design – Meaning, Types and Significance, Sample Design – Meaning and Significance Essentials of a good sampling Stages in Sample Design Sampling methods/techniques Sampling Errors	<b>10</b>
<b>4</b>	<b>Research Methodology</b>	Meaning of Research Methodology ,Stages in Scientific Research Process: Identification and Selection of Research Problem, Formulation of Research Problem, Review of Literature, Formulation of Hypothesis, Formulation of research Design, Sample Design , Data Collection, Data Analysis, Hypothesis testing and Interpretation of Data, Preparation of Research Report	<b>08</b>
<b>5</b>	<b>Formulating Research Problem</b>	Considerations: Relevance, Interest, Data Availability, Choice of data, Analysis of data, Generalization and Interpretation of analysis	<b>08</b>
<b>6</b>	<b>Outcome of Research</b>	Preparation of the report on conclusion reached, Validity Testing & Ethical Issues, Suggestions and Recommendation	<b>08</b>

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# MODULE I

# 1

## INTRODUCTION AND BASIC RESEARCH CONCEPTS

### Unit Structure

- 1.1 What is Research and Research – Definition?
- 1.2 Concept of Construct
- 1.3 Postulate and Preposition
- 1.4 Thesis
- 1.5 Hypothesis
- 1.6 Law and Principle
- 1.7 Research methods vs. Methodology
- 1.8 Need of Research in Business and Social Sciences
- 1.9 Objectives of Research
- 1.10 Issues and Problems in Research
- 1.11 Characteristics of Research: Systematic, Valid, Verifiable, Empirical and Critical

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### 1.1 WHAT IS RESEARCH AND RESEARCH – DEFINITION?

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Research can be defined as a systematic activity of exploration that attempts to find explanation and resolution to a problem. We can outline research as an action of organized examination that seeks answers to a problem. Research is part of every day's life, even when we read newspaper article, book or a report it's about research. Research helps us in finding new facts, evidence, supports us in verifying the available knowledge and helps us in making us question things that are difficult to understand as per existing data.

The term research is made up of has two parts re mean again and search which means find, signifies that we are trying to investigate into the aspect once again try to find some new information, about something.

As per definition of Clarke & Clarke “Research is a organized and independent investigation conducted to cover valid facts, draw inferences and institute ideologies regarding and recognizable problem in certain arena of knowledge.”

Creswell defines it as “research approach which comprises strategies and methods for research that extend the decisions from general assumptions to thorough methods of data gathering and reasoning.”

A wide-ranging definition of research is given by Martyn S -In the widest sense of the word, the definition of research includes any gathering of data, info and facts for the progression of information and knowledge. The research process involves the various steps. However the order of steps may differ on the topic matter and investigator, the following steps are generally part of utmost recognized investigation whether it's basic research or applied research.

- Establishment of the subject
- Hypothesis
- Abstract or Concept definition
- Operational definitions
- Collection of data
- Scrutiny of data
- Testing
- Reviewing of hypothesis
- Conclusion

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## 1.2 CONCEPT OF CONSTRUCT

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Constructs are wide-ranging concepts or areas for a study. Broadly constructs are the elementary building blocks of theories, which support us to clarify how, why and why certain phenomena act the way that they do. Constructs are restrained latent variable because they cannot be directly evident or measured. Typical constructs in marketing research include Brand Loyalty, Customer Satisfaction etc. Constructs are the basis of working hypotheses. During the research process we need to evidently and precisely clarify the theories, constructs, and variables that we are concerned in, as well as we explain the relationship among them.

Constructs can be abstractly defined in that they have significance in theoretical terms. They can be abstract and do not principally need to be directly evident. Illustrations of constructs include intellect or life fulfillment. Some concepts such as a person's height are specific and unbiased, whereas other concepts such as a person's persona may be more non-figurative and tough to imagine. Constructs are coherent ideas that we used to express the viewpoints, individuals, organizations, actions or things that we are concerned with. Constructs are a means of fetching concept and theories to ground and serving to explain the different components of theories and witness their behavior. Below are some examples of different types of constructs presented in the tabular format:

Types of constructs	Examples
<b>Ideas</b>	Self-esteem, Poverty, Ageism, Racism, Air pollution etc
<b>People</b>	Age, Gender, Height, Obesity, Fatigue
<b>Organizations</b>	Financial performance, Corporate social responsibility, corporate governance
<b>Events</b>	Disaster, Secularism
<b>Objects/Things</b>	Sun, Hurricanes, Tsunamis, Trees, Flowers

Challenging theories requires gaging the construct precisely, acceptably and in systematic scientific manner, before the strength of their associations can be tested. Measurement refers to watchful, thoughtful observations of the real world and is the real core of research. Some construct in research, such as individuals weight or can be firm's size are easy to measure other constructs such as creativity etc. may be considerably harder to measure.

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### 1.3 POSTULATE AND PREPOSITION

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The main goal of exploration or research is to determine answers to queries through the application of events and procedures. Its purpose is to find the facts which are unseen and is discovered yet.

A statement that is supposed to be correct as the basis for intellectual, argument, or belief without any proof is a postulate. Postulates, or axioms, are the elementary conventions with which any person would agree.

A simple example of a postulates is "Parallel lines do not intersect each other." Postulates must be reliable, meaning that one should not contradict other. They are also self-determining, and independent.

The term hypothesis and preposition both confer about the construction of a likely answer to a precise scientific question. Preposition pacts with pure thoughts and concepts for which no practical test is done. A systematic preposition is alike to a hypothesis, but its main purpose is to recommend relation between the concepts in a situation where the relation or link cannot be verified by experiment.

A proposition in research is an explanation about the concepts that may be refereed as correct or incorrect if it states and refers to evident process. When a proposition is expressed for testing its empirical and it is termed as hypothesis. For any hypothesis to be valid, it must make calculations and prediction that scientist can test and validate using experiment mainly which is scientific theory.

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### 1.4 THESIS

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Term dissertation is derived from the Latin word where dissertation means "path". In few countries, dissertations are also stated to as a thesis. As per

Oxford Dictionary, dissertations can also be defined as long essays on a particular subject or topic written especially for a college degree.

A thesis is an extended academic paper that typically serves as concluding research work for university research degree. A research thesis is our anticipated answer to the research question, which we conclude only after finishing the research.

Thesis is an extensive investigational, design, or theoretical report, with a problem methodology, outcomes, argument structure.

Thesis can have body, which provides the introduction, narrative, and analysis of your work. The body includes these elements:

### **Introduction:**

- (1) the determination of the research,
- (2) the problem being examined,
- (3) the circumstantial (background and its significance) of the problem (citing previous work by others that's literature review )

**Concept / Theory:** Develop the theoretical basis for your strategy or experimental work, including any prevailing equations.

- **Methodology, apparatus, and procedures:** List and describe key resources and details of apparatus. For design amendments, this section includes component design, fabrication, assembly, and testing measures.
- **Outcomes or Results:** Present the results, generally with tables and graphs. Illustrate the patterns and quality of the results and estimate their accuracy and precision. Detailed data is presented in appendix.
- **Discussion:** Discuss the significance of the outcomes, stating clearly what their significance is. Link the results with theoretical outlooks and interpretation for whatever is expected and unexpected.
- **Conclusions:** Review the results in relation to the original problem statement. Assess the success of the study in light of the criteria of success you gave in the introduction.
- **Recommendations:** If applicable, recommend directions for future work. Detailed calculations go to an appendix.

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## **1.5 HYPOTHESIS**

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A hypothesis is a probable explanation and description of something that happens or what you perceive and observe to be right. It can also be used to determine the relationship between two or more variables that we think might be linked to each other.



In scientific terms, it is a tentative theory or testable statement about the relationship between two or more variables i.e., independent and dependent variable. It is a presumptive declaration of a proposition or a sensible presumption, based upon the existing evidence, which the researcher seeks to demonstrate through his research work. A hypothesis will give a reasonable explanation that will be verified.

According to Definition of Lundberg, “A hypothesis is a uncertain generalization, the cogency and its validity which needs to be verified. In elementary phase, the hypothesis may be any predisposition, guess, imaginative clue, which evolves the basis for act or scrutiny”. We can call hypothesis a postulation, proclamation or a clue about a phenomenon, association or state, the genuineness or certainty of which we may not know. These assumptions become the foundation of an investigation. Hypothesis raises clarity, specificity and attention to a research problem, but is not crucial for a study. The structure of hypothesis provides a study with focus. It tells you what exact characteristics of a research problem to investigate. It's the hypothesis which shapes what facts and figures to collect and what not to collect thereby clarifies aim and gives direction to the study. As it provides a motivation and right focus, the structure of a hypothesis augments fairness in research work.

The hypothesis is a clear declaration of what is planned to be examined. Hypothesis should be definite and defined before research work is directed and should openly be stated in reporting the results. It allows us to:

- Recognize the research purpose.
- Recognize the main abstract ideas involved in the work.
- Recognize its association between the literature review and problem declaration.
- Unless we lessen it into Hypothesis form, we can't solve it scientifically solved it.
- It can be established i.e., demonstrable or verifiable.
- It is neither too precise nor too general.
- It is a forecast of expected consequences.
- It is considered valuable even if established untrue.

Statistics support individuals with measures for data collection, analysis, understanding and recommending their findings. A null hypothesis is a critical component of statistics and research in a variety of areas like financial analysis, market research etc. Mainly the hypothesis is of two types:

**Null Hypothesis:**

Null hypothesis is a generic statement which states no association between two variables or two phenomena. These are used when the investigator feels or believes there is no association among two variables or when there is insufficient theoretical or empirical info to state a hypothesis. It is typically symbolized by  $H_0$  or  $H_n$ .

**Alternative Hypothesis:**

The alternative hypothesis is a declaration of what a hypothesis assessment is set up to launch or find. It's denoted by  $H_1$  or  $H_a$ . It is contradictory of Null Hypothesis. It is only chosen if  $H_a$  is rejected. Normally alternative hypothesis is concrete desired inference of the researcher.

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## **1.6 LAW AND PRINCIPLE**

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Laws are reasoned over lots of observations and accounting for various likelihoods of contending hypotheses. They don't explain a mechanism by which a phenomenon occurs, but, rather, describe these numerous observations. It is the **law** which tells us significant understanding about the nature of the cosmos. Law can be experimentally tested by taking into consideration universal rule which governs universe and its observations. Law may be like Newton's law which may be one set of criteria for describing phenomena of Newton's first law which describes about an object will endure to rest or change at a continual velocity motion until and unless it is operated by an outside force.

A principle is a regulation or mechanism by which precise methodical and scientific phenomena effort. Principles characteristically have extra necessities or conditions when it can be used. They usually involve more clarification to articulate as contrasting to a sole universal equation. Principles can also define exact values and ideas for ex entropy or Archimedes principle, which relates buoyancy to the weight of expatriate water. Researchers typically follow a technique of classifying a problem, aggregation information, creating and testing hypotheses and drawing inferences when shaping principles.

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## **1.7 RESEARCH METHODS VS METHODOLOGY**

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Research methods are various actions, systems, stages or steps and algorithms used in research process. All the methods or means used by a researcher during a research progression are labeled as research methods. They are fundamentally prearranged, scientific and methodical. Methods comprise of explanations, observations, measures, experiments, numerical, or can be a statistical method, etc.

A research method attempts to define those methods or procedures which the researcher has prearranged to answer the research inquiries, resolve the hypothesis, and eventually solve the investigation problem, regardless of whether the research belongs to the social sciences or any other

disciplines. It illuminates the measures used to gather data as well as the methods for data analysis, among others.

It is the research methods which helps us to collect trials, sample data and find an appropriate answer to a problem. If there are any commercial or any business and scientific research methods then clarifications are grounded on collected evidences, dimensions and observations and not just only on perceptive reason alone. It is accepted if explanations are verified by experiments.

Research methodology provides a systematic way to resolve a problem. It is a discipline of perusal how research is to be supported and executed. Essentially, research methodology is the procedure by which investigators go about their work of describing; explaining and forecasting phenomena are called research methodology. It can also be defined as the learning of systems by which information is expanded. It is a science of studying how investigation is to be carried out. Principally, the measures by which investigators go about their effort of unfolding, explaining and forecasting phenomena are called research methodology. It is also well-defined as the study of methods by which information is gained. Its aim is to give the work plan of research.

Research methods are dissimilar from research methodologies as they are the ways in which we will gather the data for our investigation. The following are types of research methods quantitative, qualitative, and mixed research methods.

### **Quantitative Research Method:**

- **Closed - ended questionnaires / survey:**

These types of questionnaires or surveys are like multiple choice questions, where applicants must select from a list of premade answers. As per the content of the question, they must select the one that they agree with the most. This approach is the simplest form of quantitative research because the data is easy to pool and **quantify**.

- **Structured interviews:**

These are a common research method in market research because the data can be quantified. They are rigorously designed for structured interview process so that the facts will not be skewed. We can conduct structured interviews in-person, online, or over the phone.

### **Quantitative Research Measures:**

When you are considering a quantitative approach to your research, we need to identify why types of measures you will use in our investigation. This will determine what type of facts and figures we will be using to collect your data. There are four stages of dimension:

**Nominal:**

These are numbers where the order of the numbers does not matter. They aim to identify separate information. One example is collecting pin codes from research participants. The order of the numbers does not matter, but the series of numbers in each zip code indicate different information.

**Ordinal:**

In ordinal type of dimension, the ranking and order of these numbers matters. This is when items are given a specific rank according to specific criteria. A common example of ordinal measurements includes ranking-based questionnaires, where participants are asked to rank items from least preferred to most preferred.

**Interval:**

The distance between each number is the same and this is when the data are ordered. An example of interval data is test grades.

**Ratio:**

These are when the data are ordered and have a constant distance between numbers, but have a zero point. This means that there could be a measurement of zero of whatever we are measuring in our study.

**Qualitative Research Method:****Focus Groups:**

This is when a select group of people gather to talk about a specific topic. They are usually led by a mediator to help guide the discussion and ask certain questions. It is critical that a mediator allows all and diverse in the group to get a chance to speak so that no one dominates the discussion.

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## **1.8 NEED OF RESEARCH IN BUSINESS AND SOCIAL SCIENCES**

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**Research** is the structure and a basic slab upon whose entire building of growth of mankind rests. It unlocks the gates of the mind which gives us understanding of what and why things are done and how it should be done. It is actually a way to study the patterns, opinions, and attitudes so that we can determine what will happen next.

Industries, businesses, societies, and countries have a vested interest in research as it leaves a permanent mark on work that result in evolution. It is actually a prearranged process of finding somewhat precise that will support in work afterward in the close future.

Research is backbone of nearly all businesses for example manufacturing, beverage, software, healthcare, pharmaceuticals, aerospace, robotics, energy, etc. All have adapted research and development cells to support in improving services and product. These research sectors assist

to distinguish the products and services of one business from the other so that they can score extra points and increase competitive advantage over others.

**Example:** A company wants to launch a new model smart phone in the market. But company is not cognizant of what are the proportions of a mobile that are in greatest demand. Therefore, the company conducts business research by means of various approaches to gather data and the same is then assessed and decisions are drawn, as to what proportions are most in-demand, this will allow the investigator to make wise choices to position his smart phone at the true price in the market and so that they can acquire a larger market share.

Business research can be done for everything and anything. It's about research questions to identify where to invest for growth of company and for increased sales, profits. Research is critical to make prudent and up-to-date decisions.

Social sciences refer to business, market, demography, psychology, sociology, etc. It directly involves people and mainly deals with the behavior of individuals in their different roles, such clients, competitors, manufacturers, administrators, salespersons, leaders, workers, followers, tutors, students, etc. Research in social sciences deals with the organized system of determining new facts or of authenticating old actualities, their arrangement, inter-relationship, and the accepted universal laws which cover them.

The importance that social science research exercises today is vast and expanding. As social, business and economic problems overflow, the implication of social research gets improved as it provides practical solutions.

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## 1.9 OBJECTIVES OF RESEARCH

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Research is an innovative accumulation to the obtainable knowledge, which is actually to contribute knowledge for its further advancement. It is an effort to follow facts through the methods of learning, opinion, judgment and experimentation. In total, research is the search for facts, by means of objective and orderly methods to find solution to a problem.

Imagine you're scheduling a vacation in an overseas. You're on a constricted budget and need to plan a pocket-friendly plan. From where to start is first step is to do your research. We usually start by making a mental list of objectives like discovery of reasonably-priced hostels, travel etc. These objectives help us to focus sharply throughout our research. Research is a part of our daily lives. Whether it's to pick a cafeteria for party or to make a presentation at work, decent research is the basis of effective learning.

The objectives of research should be prudently linked to the challenging and problem statement, giving way to precise and attainable goals. Good and Robust research objectives should use SMART objective format.

Smart objective makes objectives stronger and easier to understand, which can make you more likely to achieve them. Make sure your objectives meet these criteria like Specific, Measurable, Achievable, Relevant and Time Based. The research objectives may be broadly grouped as follows:

- 1) It should advance awareness with innovative and novel visions into a phenomenon which is formative research studies.
- 2) It should correctly represent the features and characteristics of a particular person, group, or a condition which is type called as descriptive research studies.
- 3) It should analyze the occurrence with which approximately some event occurs is type of diagnostic research studies.
- 4) It should scrutinize the hypothesis of a fundamental association between two variables is type of hypothesis-testing research studies

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## 1.10 ISSUES AND PROBLEMS IN RESEARCH

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Problem in research is defined as a part of concern that needs a meaningful understanding of an exact subject, a condition, an inconsistency, or a difficulty. A research problem means discovery or finding answers to queries or consolidation prevailing findings to link the knowledge gap to resolve issues. One of the greatest components of a study is the research problem. In real, the research problem ambitions the entire study; if we do not have a research problem, then we do not have to study. Researchers have to understand the importance of the research problem and have to exactly identify research problem.

### **The faces of a research problem statement are:**

- It's essential to address the gap in knowledge.
- It required aid in further research work too.
- Essentially it should provide noteworthy contribution.
- With Data collected, it must give good understanding of the problem.

A research question or problem must be up-front, to the point, fixated, and suitably complex to capture the most pertinent information. Follow these examples to write a problem statement:

**Inappropriate:** What are the effects of social media on people?

**Precise:** What effect does using Twitter everyday have on adolescents?

In the above example, the first investigation is not exact enough to capture precise response. It's not clear what social media we are talking about and what people or age group we are stating.

Research problem is the gap in prevailing facts that we want to address, an issue with a method (e.g., student registration and validation of data) that

is known and well recognized and needs a resolution, or some amazing phenomena or may be previous conclusions that point to the necessity for extra investigation. Approach can be hypothetical or applied, and the precise type of problem we select to address depends on the type of research we want to do.

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## 1.11 CHARACTERISTICS OF RESEARCH: SYSTEMATIC, VALID, VERIFIABLE, EMPIRICAL AND CRITICAL

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The term research denotes a logical method including articulating the issue of problem, affirming or expressing a hypothesis, collecting the data and facts, analyzing the information, and getting certain conclusions both in the shape of solutions relating to stated issues or indefinite generalizations for some theoretical construction. Thus, it is quest of an investigated entity to produce some facts out of the identified entity.

Research is a procedure of gathering, investigating and interpreting data to answer questions. Nonetheless to meet the requirements as research, the method must have certain characteristics: essentially, as far as possible, it should be rigorous, systematic, methodical, valid and verifiable, empirical and critical.

### Characteristics of Research:

- **Systematic and Rigorous:** Systematic suggests that the techniques implemented to undertake the study follow a certain reasonable and logical arrangement and sequence. The diverse steps cannot be engaged in a chaotic way. Some proper measures must tail others. Here rigorous means we must be reliable in confirming that the procedures followed to find answers to questions are applicable, fitting and are justified.
- **Valid and Verifiable:** It infers that whatever we achieve on the basis of our conclusions is correct and can be verified by researcher himself and others too.
- **Empirical:** This characteristic which confirms inferences drawn are based on evidence collected from data collected from factual natural life practices or observations.
- **Critical:** Examination of the procedures used and the systems employed is crucial to a research investigation. The process of investigation must be fool proof and restrict weaknesses. The procedure adopted and the measures used must be able to withstand critical scrutiny.

For a procedure to be called research, it is imperious that it has the above characteristics.

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## TYPES OF RESEARCH

### Unit Structure

- 2.1 Objective
- 2.2 Introduction
- 2.3 Basic Research
- 2.4 Applied Research
- 2.5 Descriptive Research
- 2.6 Analytical Research
- 2.7 Empirical Research
- 2.8 Qualitative and Quantitative Approaches
- 2.9 Summary
- 2.10 Practise Questions
- 2.11 References

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### 2.1 OBJECTIVE

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- 1. Understand Research and Research Process and their types
- 2. Acquaint students with identifying problems for research
- 3. Explain the various research strategies and apply them to various research problems

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### 2.2 INTRODUCTION

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According to Plutchick R,” Research has its origin in a term which means to go around and explore and it is a combination of Re + Search”.

According to Kerlinger, “Research is a Systematic, Controlled, Empirical and Critical investigation of hypothetical propositions about the presumed relations among phenomenon”.

According to one more definition, Research may be defined the systematic method of discovering new facts and/or verifying old facts, their sequences, interrelationships, causal explanations and the laws which governs these facts.

Literally, research (re-search) means “to search again.” The term connotes patient study and scientific investigation wherein the researcher takes another, more careful look at the data to discover all that is known about the subject. Ultimately, all findings are tied back to the underlying theory.



Research regarding production, finance, marketing, and management in for-profit corporations is business research. However, business research also includes efforts that assist nonprofit organizations. Social researchers setup research for the purpose of gathering and analyzing information for their operations and for making in-depth studies on effective conditions of social subjects.

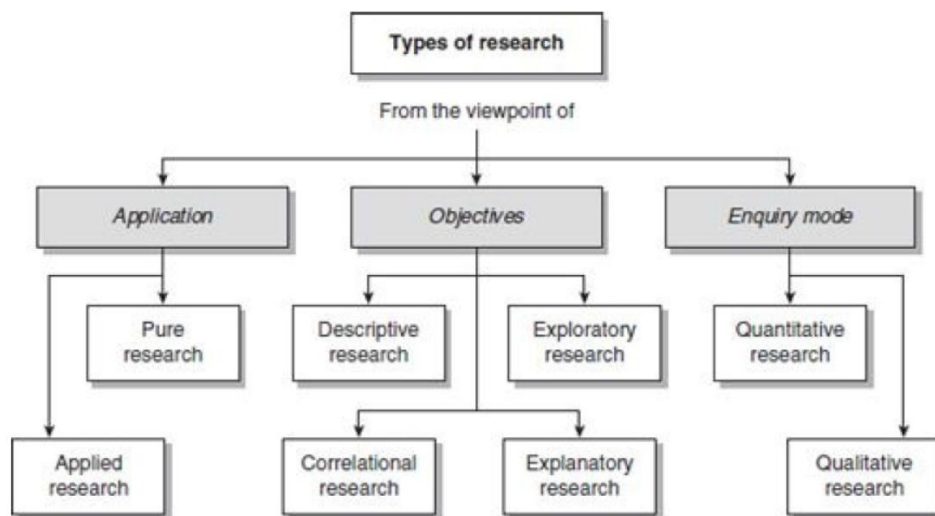
Academicians setup research to enrich reservoir of knowledge and improving the teaching learning pedagogy. Science and Technology conducts research to make the society more advance and prosperous. Research in medicine has increased the life expectancy period.

Government agencies are also important user of research to address the way people view and use various G2C services. Defence and Research Development organization carries research upon system and management of battlefield on land, sea and aerospace.

### Types of Research:

Types of research can be looked at from three different perspectives

1. applications of the findings of the research study;
2. objectives of the study;
3. mode of enquiry used in conducting the study.



The classification of the types of a study on the basis of these perspectives is not mutually exclusive: that is, a research study classified from the viewpoint of 'application' can also be classified from the perspectives of 'objectives' and 'enquiry mode' employed. For example, a research project may be classified as pure or applied research (from the perspective of application), as descriptive, correlational, explanatory or exploratory (from the perspective of objectives) and as qualitative or quantitative (from the perspective of the enquiry mode employed).

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## 2.3 PURE / BASIC RESEARCH

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In the social sciences, according to Bailey (1978: 17):” Pure / Basic research involves developing and testing theories and hypotheses that are intellectually challenging to the researcher but may or may not have practical application at the present time or in the future. Thus, such work often involves the testing of hypotheses containing very abstract and specialised concepts.”

Pure research is also concerned with the development, examination, verification and refinement of research methods, procedures, techniques and tools that form the body of research methodology.

Examples of pure research include developing a sampling technique that can be applied to a particular situation; developing a methodology to assess the validity of a procedure; developing an instrument, say, to measure the stress level in people; and finding the best way of measuring people’s attitudes. The knowledge produced through pure research is sought in order to add to the existing body of knowledge of research methods.

Most of the research in the social sciences is applied. In other words, the research techniques,

procedures and methods that form the body of research methodology are applied to the collection of information about various aspects of a situation, issue, problem or phenomenon so that the information gathered can be used in other ways – such as for policy formulation, administration and the enhancement of understanding of a phenomenon.

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## 2.4 APPLIED RESEARCH

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A research study classified as a descriptive study attempts to describe systematically a situation, problem, phenomenon, service or programme, or provides information about, say, the living conditions of a community, or describes attitudes towards an issue. For example, it may attempt to describe the types of service provided by an organisation, the administrative structure of an organisation, the living conditions of Aboriginal people in the outback, the needs of a community, what it means to go through a divorce, how a child feels living in a house with domestic violence, or the attitudes of employees towards management. The main purpose of such studies is to describe what is prevalent with respect to the issue/problem under study.

The main emphasis in a correlational study is to discover or establish the existence of a

Relationship / association / Interdependence between two or more aspects of a situation. What is the impact of an advertising campaign on the sale of a product? What is the relationship between stressful living and the incidence of heart attack? What is the relationship between fertility and mortality? What is the relationship between technology and

unemployment? What is the effect of a health service on the control of a disease, or the home environment on educational achievement? These studies examine whether there is a relationship between two or more aspects of a situation or phenomenon and, therefore, are called correlational studies.

Applied research is conducted to address a specific business decision for a specific firm or organization. Basic business research (pure research) is conducted without a specific decision in mind, and it usually does not address the needs of a specific organization. It attempts to expand the limits of knowledge in general, and as such it is not aimed at solving a particular pragmatic problem. Basic research can be used to test the validity of a general business theory or to learn more about a particular business phenomenon.

<b>Applied Research</b>	<b>Basic Research</b>
Conducted to address a specific business decision.	Conducted without a specific decision in mind.
Solves specific problem.	Expands current knowledge.
Problem driven.	Curiosity driven.
The problem statement helps in defining the objective of research.	An exhaustive and thorough review of literature required.
Practical and descriptive.	Theoretical and explanatory.
Specific scope / Limited scope.	Wider scope.
Direct commercial objective.	Don't have direct commercial objective.
Conducted in more real-world settings.	Conducted in real world setting or real world like settings/parameters.
Generally, time bounded.	Generally, not time bounded.
A researcher is examining various levels of toxic substance to determine the maximum safe level for fish in a stream.	A researcher is studying the heart chambers of various fish species.

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## **2.5 DESCRIPTIVE RESEARCH**

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Descriptive Research is a form of research that incorporates surveys as well as different varieties of fact-finding investigations. This form of research is focused on describing the prevailing state of affairs as they are. Descriptive Research is also termed as Ex post facto research.

This research form emphasises on factual reporting, the researcher cannot control the involved variables and can only report the details as they took place or as they are taking place. Researchers mainly make use of a descriptive research approach for purposes such as when the research is aimed at deciphering characteristics, frequencies or trends. Ex post facto studies also include attempts by researchers to discover causes even when

they cannot control the variables. The descriptive research methods are mainly, observations, surveys as well as case studies.

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## 2.6 ANALYTICAL RESEARCH

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Analytical Research is a form of research where the researcher has to make do with the data and factual information available at their behest and interpret this information to undertake an acute evaluation of the data.

This form of research is often undertaken by researchers to uncover some evidence that supports their present research and which makes it more authentic. It is also undertaken for concocting fresh ideas relating to the topic on which the research is based.

From conducting meta analysis, literary research or scientific trials and learning public opinion, there are many methods through which this research is done.

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## 2.7 EMPIRICAL RESEARCH

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This is a research method that focuses solely on aspects like observation and experience, without focusing on the theory or system. It is based on data and it can churn conclusions that can be confirmed or verified through observation and experiment. Empirical Research is mainly undertaken to determine proof that certain variables are affecting the others in a particular way.

This kind of research can also be termed as Experimental Research. In this research it is essential that all the facts are received first hand, directly from the source so that the researcher can actively go and carry out the actions and manipulate the concerned materials to gain the information he requires.

In this research a hypothesis is generated and then a path is undertaken to confirm or invalidate this hypothesis. The control that the researcher holds over the involved variables defines this research. The researcher can manipulate one of these variables to examine its effect.

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## 2.8 QUALITATIVE AND QUANTITATIVE APPROACHES

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The structured approach to enquiry is usually classified as quantitative research and unstructured as qualitative research.

The choice between quantitative and qualitative approaches (or structured or unstructured) should depend upon:

- **Aim of your enquiry:** exploration, confirmation or quantification.
- **Use of the findings:** policy formulation or process understanding.

A study is classified as qualitative if the purpose of the study is primarily to describe a situation, phenomenon, problem or event; if the information is gathered through the use of variables measured on nominal or ordinal scales (qualitative measurement scales); and if the analysis is done to establish the variation in the situation, phenomenon or problem without quantifying it. The description of an observed situation, the historical enumeration of events, an account of the different opinions people have about an issue, and a description of the living conditions of a community are examples of qualitative research.

On the other hand, the study is classified as quantitative if you want to quantify the variation in a phenomenon, situation, problem or issue; if information is gathered using predominantly quantitative variables; and if the analysis is geared to ascertain the magnitude of the variation. Examples of quantitative aspects of a research study are: How many people have a particular problem? How many people hold a particular attitude?

The use of statistics is not an integral part of a quantitative study. The main function of statistics is to act as a test to confirm or contradict the conclusions that you have drawn on the basis of your understanding of analysed data. Statistics, among other things, help you to quantify the magnitude of an association or relationship, provide an indication of the confidence you can place in your findings and help you to isolate the effect of different variables.

It is strongly recommended that you do not 'lock yourself' into becoming either solely a quantitative or solely a qualitative researcher. It is true that there are disciplines that lend themselves predominantly either to qualitative or to quantitative research. For example, such disciplines as anthropology, history and sociology are more inclined towards qualitative research, whereas psychology, epidemiology, education, economics, public health and marketing are more inclined towards quantitative research. However, this does not mean that an economist or a psychologist never uses the qualitative approach, or that an anthropologist never uses quantitative information. There is increasing recognition by most disciplines in the social sciences that both types of research are important for a good research study. The research problem itself should determine whether the study is carried out using quantitative or qualitative methodologies.

As both qualitative and quantitative approaches have their strengths and weaknesses, and advantages and disadvantages, 'neither one is markedly superior to the other in all respects' (Ackroyd & Hughes 1992: 30). The measurement and analysis of the variables about which information is obtained in a research study are dependent upon the purpose of the study. In many studies you need to combine both qualitative and quantitative approaches. For example, suppose you want to find out the types of service available to victims of domestic violence in a city and the extent of their utilisation. Types of service is the qualitative aspect of the study as finding out about them entails description of the services. The extent of

utilisation of the services is the quantitative aspect as it involves estimating the number of people who use the services and calculating other indicators that reflect the extent of utilisation.

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## 2.9 SUMMARY

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There are several ways of collecting and understanding information and finding answers to your questions – research is one way. The difference between research and other ways of obtaining answers to your questions is that in a process that is classified as research, you work within a framework of a set of philosophies, use methods that have been tested for validity and reliability, and attempt to be unbiased and objective.

Research has many applications. You need to have research skills to be an effective service provider, administrator/manager or planner. As a professional who has a responsibility to enhance professional knowledge, research skills are essential. The typology of research can be looked at from three perspectives: application, objectives and the enquiry process. From the point of view of the application of research, there is applied and pure research. Most of the research undertaken in the social sciences is applied, the findings being designed either for use in understanding a phenomenon/issue or to bring change in a programme/situation.

Pure research is academic in nature and is undertaken in order to gain knowledge about phenomena that may or may not have applications in the near future, and to develop new techniques and procedures that form the body of research methodology. A research study can be carried out with four objectives: to describe a situation, phenomenon, problem or issue (descriptive research); to establish or explore a relationship between two or more variables (correlational research); to explain why certain things happen the way they do (explanatory research); and to examine the feasibility of conducting a study or exploring a subject area where nothing or little is known (exploratory research). From the point of view of the mode of enquiry, there are two types of research: quantitative (structured approach) and qualitative (unstructured approach). The main objective of a qualitative study is to describe the variation and diversity in a phenomenon, situation or attitude with a very flexible approach so as to identify as much variation and diversity as possible, whereas quantitative research, in addition, helps you to quantify the variation and diversity. There are many who strongly advocate a combined approach to social enquiries.

These are the two paradigms that form the basis of social science research. Though these may provide values, terminology, methods and techniques for you to apply to your research, it is the purpose of research rather than the paradigm that should determine the mode of enquiry.

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## 2.10 PRACTISE QUESTIONS

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- 1) Define Research. Explain the application areas of Research.

- 2) What do you mean by research? Explain its significance in modern times.
- 3) Describe the different types of research, clearly pointing out the from the different point of view.
- 4) “Research is much concerned with proper fact finding, analysis and evaluation.” Do you agree with this statement? Give reasons in support of your answer.
- 5) Distinguish between the following:
  - a. Basic Research and Applied Research
  - b. Qualitative Research and Quantitative Research
- 6) Write short notes on:
  - c. Basic Research
  - d. Applied Research
  - e. Descriptive Research
  - f. Analytical Research
  - g. Empirical Research
  - h. Qualitative and Quantitative Approaches

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## 2.11 REFERENCES

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- Garg.B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
- Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition. New Age International Publishers, New Delhi.
- Pruzan, Peter , Research Methodology, The Aims, Practices and Ethics of Science , ISBN 978-3-319-27167-5
- Dawson, Catherine, 2002, Practical Research Methods, New Delhi, UBS Publishers Distributors
- Wadehra, B.L.2000. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
- Kumar Ranjit, 2005, Research Methodology-A Step-by-Step Guide for Beginners, (2nded), Singapore, Pearson Education

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## RESEARCH DESIGN AND SAMPLE DESIGN

### Unit Structure

- 3.1 Objective
- 3.2 Introduction
- 3.3 Research Design – Meaning, Types and Significance
- 3.4 Sample Design – Meaning and Significance Essentials of a good sampling
- 3.5 Stages in Sample Design
- 3.6 Sampling methods/techniques
- 3.7 Sampling Errors
- 3.8 Summary
- 3.9 Practise Questions
- 3.10 References

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### 3.1 OBJECTIVE

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- 1. Understand Research and Research Process and their types
- 2. Acquaint students with identifying problems for research
- 3. Explain the various research strategies and apply them to various research problems

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### 3.2 INTRODUCTION

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The research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring you will effectively address the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data. There are three main types of designs for research:

- Data collection
- Measurement
- Analysis

The type of research problem an organization is facing will determine the research design and not vice-versa. The design phase of a study determines which tools to use and how they are used.



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### 3.3 RESEARCH DESIGN – MEANING, TYPES AND SIGNIFICANCE

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#### **Meaning:**

“A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.”

The research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. As such the design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data. More explicitly, the design decisions happen to be in respect of:

- (i) What is the study about?
- (ii) Why is the study being made?
- (iii) Where will the study be carried out?
- (iv) What type of data is required?
- (v) Where can the required data be found?
- (vi) What periods of time will the study include?
- (vii) What will be the sample design?
- (viii) What techniques of data collection will be used?
- (ix) How will the data be analysed?
- (x) In what style will the report be prepared?

#### **The important features of a research design as under:**

- (i) It is a plan that specifies the sources and types of information relevant to the research problem.
- (ii) It is a strategy specifying which approach will be used for gathering and analysing the data.
- (iii) It also includes the time and cost budgets since most studies are done under these two constraints.

#### **In brief, research design must, at least, contain:**

- (a) a clear statement of the research problem;
- (b) procedures and techniques to be used for gathering information;
- (c) the population to be studied; and
- (d) methods to be used in processing and analysing data.

**Important Concepts Relating To Research Design:****1. Dependent and independent variables:**

A concept which can take on different quantitative values is called a variable. As such the concepts like weight, height, income are all examples of variables. Qualitative phenomena (or the attributes) are also quantified on the basis of the presence or absence of the concerning attribute(s). Phenomena which can take on quantitatively different values even in decimal points are called 'continuous variables'.\* But all variables are not continuous.

If they can only be expressed in integer values, they are non-continuous variables or in statistical language 'discrete variables'. Age is an example of continuous variable, but the number of children is an example of non-continuous variable. If one variable depends upon or is a consequence of the other variable, it is termed as a dependent variable, and the variable that is antecedent to the dependent variable is termed as an independent variable. For instance, if we say that height depends upon age, then height is a dependent variable and age is an independent variable. Further, if in addition to being dependent upon age, height also depends upon the individual's sex, then height is a dependent variable and age and sex are independent variables. Similarly, readymade films and lectures are examples of independent variables, whereas behavioural changes, occurring as a result of the environmental manipulations, are examples of dependent variables.

**2. Extraneous variable:**

Independent variables that are not related to the purpose of the study, but may affect the dependent variable are termed as extraneous variables. Suppose the researcher wants to test the hypothesis that there is a relationship between children's gains in social studies achievement and their self-concepts. In this case self-concept is an independent variable and social studies achievement is a dependent variable. Intelligence may as well affect the social studies achievement, but since it is not related to the purpose of the study undertaken by the researcher, it will be termed as an extraneous variable. Whatever effect is noticed on dependent variable as a result of extraneous variable(s) is technically described as an 'experimental error'. A study must always be so designed that the effect upon the dependent variable is attributed entirely to the independent variable(s), and not to some extraneous variable or variables.

**3. Control:**

One important characteristic of a good research design is to minimise the influence or effect of extraneous variable(s). The technical term 'control' is used when we design the study minimising the effects of extraneous independent variables. In experimental researches, the term 'control' is used to refer to restrain experimental conditions.

**4. Confounded relationship:**

When the dependent variable is not free from the influence of extraneous variable(s), the relationship between the dependent and independent variables is said to be confounded by an extraneous variable(s).

**5. Research hypothesis:**

When a prediction or a hypothesised relationship is to be tested by scientific methods, it is termed as research hypothesis. The research hypothesis is a predictive statement that relates an independent variable to a dependent variable. Usually a research hypothesis must contain, at least, one independent and one dependent variable. Predictive statements which are not to be objectively verified or the relationships that are assumed but not to be tested, are not termed research hypotheses.

**6. Experimental and non-experimental hypothesis-testing research:**

When the purpose of research is to test a research hypothesis, it is termed as hypothesis-testing research. It can be of the experimental design or of the non-experimental design. Research in which the independent variable is manipulated is termed 'experimental hypothesis-testing research' and a research in which an independent variable is not manipulated is called 'non-experimental hypothesis-testing research'. For instance, suppose a researcher wants to study whether intelligence affects reading ability for a group of students and for this purpose he randomly selects 50 students and tests their intelligence and reading ability by calculating the coefficient of correlation between the two sets of scores. This is an example of non-experimental hypothesis-testing research because herein the independent variable, intelligence, is not manipulated. But now suppose that our researcher randomly selects 50 students from a group of students who are to take a course in statistics and then divides them into two groups by randomly assigning 25 to Group A, the usual studies programme, and 25 to Group B, the special studies programme. At the end of the course, he administers a test to each group in order to judge the effectiveness of the training programme on the student's performance-level. This is an example of experimental hypothesis-testing research because in this case the independent variable, viz., the type of training programme, is manipulated.

**7. Experimental and control groups:**

In an experimental hypothesis-testing research when a group is exposed to usual conditions, it is termed a 'control group', but when the group is exposed to some novel or special condition, it is termed an 'experimental group'. In the above illustration, the Group A can be called a control group and the Group B an experimental group. If both groups A and B are exposed to special studies programmes, then both groups would be termed 'experimental groups.' It is possible to design studies which include only experimental groups or studies which include both experimental and control groups.

**8. Treatments:**

The different conditions under which experimental and control groups are put are usually referred to as ‘treatments’. In the illustration taken above, the two treatments are the usual studies programme and the special studies programme. Similarly, if we want to determine through an experiment the comparative impact of three varieties of fertilizers on the yield of wheat, in that case the three varieties of fertilizers will be treated as three treatments.

**9. Experiment:**

The process of examining the truth of a statistical hypothesis, relating to some research problem, is known as an experiment. For example, we can conduct an experiment to examine the usefulness of a certain newly developed drug. Experiments can be of two types viz., absolute experiment and comparative experiment. If we want to determine the impact of a fertilizer on the yield of a crop, it is a case of absolute experiment; but if we want to determine the impact of one fertilizer as compared to the impact of some other fertilizer, our experiment then will be termed as a comparative experiment. Often, we undertake comparative experiments when we talk of designs of experiments.

**10. Experimental unit(s):**

The pre-determined plots or the blocks, where different treatments are used, are known as experimental units. Such experimental units must be selected (defined) very carefully.

**Types of Research Design:**

Different research designs can be conveniently described if we categorize them as:

- (1) research design in case of exploratory research studies;
- (2) research design in case of descriptive and diagnostic research studies, and
- (3) research design in case of hypothesis-testing research studies.

**1. Research design in case of exploratory research studies:**

Exploratory research studies are also termed as formulative research studies. The main purpose of such studies is that of formulating a problem for more precise investigation or of developing the working hypotheses from an operational point of view. The major emphasis in such studies is on the discovery of ideas and insights. As such the research design appropriate for such studies must be flexible enough to provide opportunity for considering different aspects of a problem under study. Inbuilt flexibility in research design is needed because the research problem, broadly defined initially, is transformed into one with more precise meaning in exploratory studies, which fact may necessitate

changes in the research procedure for gathering relevant data. Generally, the following three methods in the context of research design for such studies are talked about:

- (a) the survey of concerning literature;
- (b) the experience survey and
- (c) the analysis of 'insight-stimulating' examples.

The survey of concerning literature happens to be the most simple and fruitful method of formulating precisely the research problem or developing hypothesis. Hypotheses stated by earlier workers may be reviewed and their usefulness be evaluated as a basis for further research. It may also be considered whether the already stated hypotheses suggest new hypothesis. In this way the researcher should review and build upon the work already done by others, but in cases where hypotheses have not yet been formulated, his task is to review the available material for deriving the relevant hypotheses from it.

Besides, the bibliographical survey of studies, already made in one's area of interest may as well as made by the researcher for precisely formulating the problem. He should also make an attempt to apply concepts and theories developed in different research contexts to the area in which he is himself working. Sometimes the works of creative writers also provide a fertile ground for hypothesis formulation and as such may be looked into by the researcher. Experience survey means the survey of people who have had practical experience with the problem to be studied. The object of such a survey is to obtain insight into the relationships between variables and new ideas relating to the research problem. For such a survey people who are competent and can contribute new ideas may be carefully selected as respondents to ensure a representation of different types of experience. The respondents so selected may then be interviewed by the investigator.

The researcher must prepare an interview schedule for the systematic questioning of informants. But the interview must ensure flexibility in the sense that the respondents should be allowed to raise issues and questions which the investigator has not previously considered. Generally, the experience collecting interview is likely to be long and may last for few hours. Hence, it is often considered desirable to send a copy of the questions to be discussed to the respondents well in advance. This will also give an opportunity to the respondents for doing some advance thinking over the various issues involved so that, at the time of interview, they may be able to contribute effectively. Thus, an experience survey may enable the researcher to define the problem more concisely and help in the formulation of the research hypothesis. This survey may as well provide information about the practical possibilities for doing different types of research.

Analysis of 'insight-stimulating' examples is also a fruitful method for suggesting hypotheses for research. It is particularly suitable in areas where there is little experience to serve as a guide.

This method consists of the intensive study of selected instances of the phenomenon in which one is interested. For this purpose the existing records, if any, may be examined, the unstructured interviewing may take place, or some other approach may be adopted. Attitude of the investigator, the intensity of the study and the ability of the researcher to draw together diverse information into a unified interpretation are the main features which make this method an appropriate procedure for evoking insights.

Now, what sort of examples are to be selected and studied? There is no clear-cut answer to it. Experience indicates that for particular problems certain types of instances are more appropriate than others. One can mention few examples of 'insight-stimulating' cases such as the reactions of strangers, the reactions of marginal individuals, the study of individuals who are in transition from one stage to another, the reactions of individuals from different social strata and the like. In general, cases that provide sharp contrasts or have striking features are considered relatively more useful while adopting this method of hypotheses formulation. Thus, in an exploratory or formulative research study which merely leads to insights or hypotheses, whatever method or research design outlined above is adopted, the only thing essential is that it must continue to remain flexible so that many different facets of a problem may be considered as and when they arise and come to the notice of the researcher.

## **2. Research design in case of descriptive and diagnostic research studies:**

Descriptive research studies are those studies which are concerned with describing the characteristics of a particular

individual, or of a group, whereas diagnostic research studies determine the frequency with which something occurs or its association with something else. The studies concerning whether certain variables are associated are examples of diagnostic research studies. As against this, studies concerned with specific predictions, with narration of facts and characteristics concerning individual, group or situation are all examples of descriptive research studies. Most of the social research comes under this category. From the point of view of the research design, the descriptive as well as diagnostic studies share common requirements and as such we may group together these two types of research studies. In descriptive as well as in diagnostic studies, the researcher must be able to define clearly, what he wants to measure and must find adequate methods for measuring it along with a clear cut definition of 'population' he wants to study. Since the aim is to obtain complete and accurate information in the said studies, the procedure to be used must be carefully planned. The research design must make enough provision for protection against bias and must maximise reliability, with due concern for the economical

completion of the research study. The design in such studies must be rigid and not flexible and must focus attention on the following:

- a) Formulating the objective of the study (what the study is about and why is it being made?)
- b) Designing the methods of data collection (what techniques of gathering data will be adopted?)
- c) Selecting the sample (how much material will be needed?)
- d) Collecting the data (where can the required data be found and with what time period should
- e) the data be related?)
- f) Processing and analysing the data.
- g) Reporting the findings.

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

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

In most of the descriptive/diagnostic studies the researcher takes out sample(s) and then wishes to make statements about the population on the basis of the sample analysis or analyses. More often than not, sample has to be designed. Different sample designs have been discussed in detail in a separate chapter in this book. Here we may only mention that the problem of designing samples should be tackled in such a fashion that the samples may yield accurate information with a minimum amount of research effort. Usually one or more forms of probability sampling, or what is often described as random sampling, are used.

To obtain data free from errors introduced by those responsible for collecting them, it is necessary to supervise closely the staff of field workers as they collect and record information. Checks may be set up to

ensure that the data collecting staff perform their duty honestly and without prejudice. "As data are collected, they should be examined for completeness, comprehensibility, consistency and reliability."

The data collected must be processed and analysed. This includes steps like coding the interview replies, observations, etc.; tabulating the data; and performing several statistical computations. To the extent possible, the processing and analysing procedure should be planned in detail before actual work is started. This will prove economical in the sense that the researcher may avoid unnecessary labour such as preparing tables for which he later finds he has no use or on the other hand, re-doing some tables because he failed to include relevant data. Coding should be done carefully to avoid error in coding and for this purpose the reliability of coders needs to be checked. Similarly, the accuracy of tabulation may be checked by having a sample of the tables re-done. In case of mechanical tabulation, the material (i.e., the collected data or information) must be entered on appropriate cards which is usually done by punching holes corresponding to a given code. The accuracy of punching is to be checked and ensured. Finally, statistical computations are needed and as such averages, percentages and various coefficients must be worked out. Probability and sampling analysis may as well be used. The appropriate statistical operations, along with the use of appropriate tests of significance should be carried out to safeguard the drawing of conclusions concerning the study.

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

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

The difference between research designs in respect of the above two types of research studies can be conveniently summarised in tabular form as under:



Research Design	Type of study	
	Exploratory or Formulative	Descriptive/Diagnostic
Overall design	Flexible design (design must provide opportunity for considering different aspects of the problem)	Rigid design (design must make enough provision for protection against bias and must maximise reliability)
(i) Sampling design	Non-probability sampling design (purposive or judgement sampling)	Probability sampling design (random sampling)
(ii) Statistical design	No pre-planned design for analysis	Pre-planned design for analysis
(iii) Observational design	Unstructured instruments for collection of data	Structured or well thought out instruments for collection of data
(iv) Operational design	No fixed decisions about the operational procedures	Advanced decisions about operational procedures.

### 3. Research design in case of hypothesis-testing research studies:

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

Professor R.A. Fisher's name is associated with experimental designs. Beginning of such designs was made by him when he was working at Rothamsted Experimental Station (Centre for Agricultural Research in England). As such the study of experimental designs has its origin in agricultural research.

Professor Fisher found that by dividing agricultural fields or plots into different blocks and then by conducting experiments in each of these blocks, whatever information is collected and inferences drawn from them, happens to be more reliable. This fact inspired him to develop certain experimental designs for testing hypotheses concerning scientific investigations. Today, the experimental designs are being used in researches relating to phenomena of several disciplines. Since experimental designs originated in the context of agricultural operations, we still use, though in a technical sense, several terms of agriculture (such as treatment, yield, plot, block etc.) in experimental designs.

#### Significance of Research Design:

Research design is needed because it facilitates the smooth sailing of the various research operations, thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money. Just as for better, economical and attractive construction of a house, we need a blueprint (or what is commonly called the map of the house) well thought out and prepared by an expert architect, similarly we need a research design or a plan in advance of data collection and analysis for our research project. 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. Preparation of the research design should be done with great care as any error in it may upset the entire project.

Research design, in fact, has a great bearing on the reliability of the results arrived at and as such constitutes the firm foundation of the entire edifice of the research work.

Even then the need for a well thought out research design is at times not realised by many. The importance which this problem deserves is not given to it. As a result many researches do not serve the purpose for which they are undertaken. In fact, they may even give misleading conclusions.

Thoughtlessness in designing the research project may result in rendering the research exercise futile. It is, therefore, imperative that an efficient and appropriate design must be prepared before starting research operations. The design helps the researcher to organize his ideas in a form whereby it will be possible for him to look for flaws and inadequacies. Such a design can even be given to others for their comments and critical evaluation. In the absence of such a course of action, it will be difficult for the critic to provide a comprehensive review of the proposed study.

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### **3.4 SAMPLE DESIGN – MEANING AND SIGNIFICANCE ESSENTIALS OF A GOOD SAMPLING**

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All items in any field of inquiry constitute a ‘Universe’ or ‘Population.’ A complete enumeration of all items in the ‘population’ is known as a census inquiry. It can be presumed that in such an inquiry, when all items are covered, no element of chance is left and highest accuracy is obtained. But in practice this may not be true. Even the slightest element of bias in such an inquiry will get larger and larger as the number of observation increases. Moreover, there is no way of checking the element of bias or its extent except through a resurvey or use of sample checks. Besides, this type of inquiry involves a great deal of time, money and energy. Therefore, when the field of inquiry is large, this method becomes difficult to adopt because of the resources involved.

“A sample design is a definite plan for obtaining a sample from a given population. It refers to the technique or the procedure the researcher would adopt in selecting items for the sample.”

Sample design may as well lay down the number of items to be included in the sample i.e., the size of the sample. Sample design is determined before data are collected. There are many sample designs from which a researcher can choose. Some designs are relatively more precise and easier to apply than others. Researcher must select/prepare a sample design which should be reliable and appropriate for his research study.

## **Characteristics Of A Good Sample Design:**

The following is the list of characteristics of a good sample:

- (a) Sample design must result in a truly representative sample.
- (b) Sample design must be such which results in a small sampling error.
- (c) Sample design must be viable in the context of funds available for the research study.
- (d) Sample design must be such so that systematic bias can be controlled in a better way.
- (e) Sample should be such that the results of the sample study can be applied, in general, for the universe with a reasonable level of confidence.

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## **3.5 STAGES IN SAMPLE DESIGN**

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While developing a sampling design, the researcher must pay attention to the following points:

### **(i) Type of universe:**

The first step in developing any sample design is to clearly define the set of objects, technically called the Universe, to be studied. The universe can be finite or infinite. In finite universe the number of items is certain, but in case of an infinite universe the number of items is infinite, i.e., we cannot have any idea about the total number of items. The population of a city, the number of workers in a factory and the like are examples of finite universes, whereas the number of stars in the sky, listeners of a specific radio programme, throwing of a dice etc. are examples of infinite universes.

### **(ii) Sampling unit:**

A decision has to be taken concerning a sampling unit before selecting sample. Sampling unit may be a geographical one such as state, district, village, etc., or a construction unit such as house, flat, etc., or it may be a social unit such as family, club, school, etc., or it may be an individual. The researcher will have to decide one or more of such units that he has to select for his study.

### **(iii) Source list:**

It is also known as 'sampling frame' from which sample is to be drawn. It contains the names of all items of a universe (in case of finite universe only). If source list is not available, researcher has to prepare it. Such a list should be comprehensive, correct, reliable and appropriate. It is extremely important for the source list to be as representative of the population as possible.

**(iv) Size of sample:**

This refers to the number of items to be selected from the universe to constitute a sample. This is a major problem before a researcher. The size of sample should neither be excessively large, nor too small. It should be optimum. An optimum sample is one which fulfills the requirements of efficiency, representativeness, reliability and flexibility.

While deciding the size of sample, researcher must determine the desired precision as also an acceptable confidence level for the estimate. The size of population variance needs to be considered as in case of larger variance usually a bigger sample is needed. The size of population must be kept in view for this also limits the sample size. The parameters of interest in a research study must be kept in view, while deciding the size of the sample. Costs too dictate the size of sample that we can draw. As such, budgetary constraint must invariably be taken into consideration when we decide the sample size.

**(v) Parameters of interest:**

In determining the sample design, one must consider the question of the specific population parameters which are of interest. For instance, we may be interested in estimating the proportion of persons with some characteristic in the population, or we may be interested in knowing some average or the other measure concerning the population. There may also be important sub-groups in the population about whom we would like to make estimates. All this has a strong impact upon the sample design we would accept.

**(vi) Budgetary constraint:**

Cost considerations, from practical point of view, have a major impact upon decisions relating to not only the size of the sample but also to the type of sample. This fact can even lead to the use of a non-probability sample.

**(vii) Sampling procedure:**

Finally, the researcher must decide the type of sample he will use i.e., he must decide about the technique to be used in selecting the items for the sample. In fact, this technique or procedure stands for the sample design itself. There are several sample designs (explained in the pages that follow) out of which the researcher must choose one for his study. Obviously, he must select that design which, for a given sample size and for a given cost, has a smaller sampling error.

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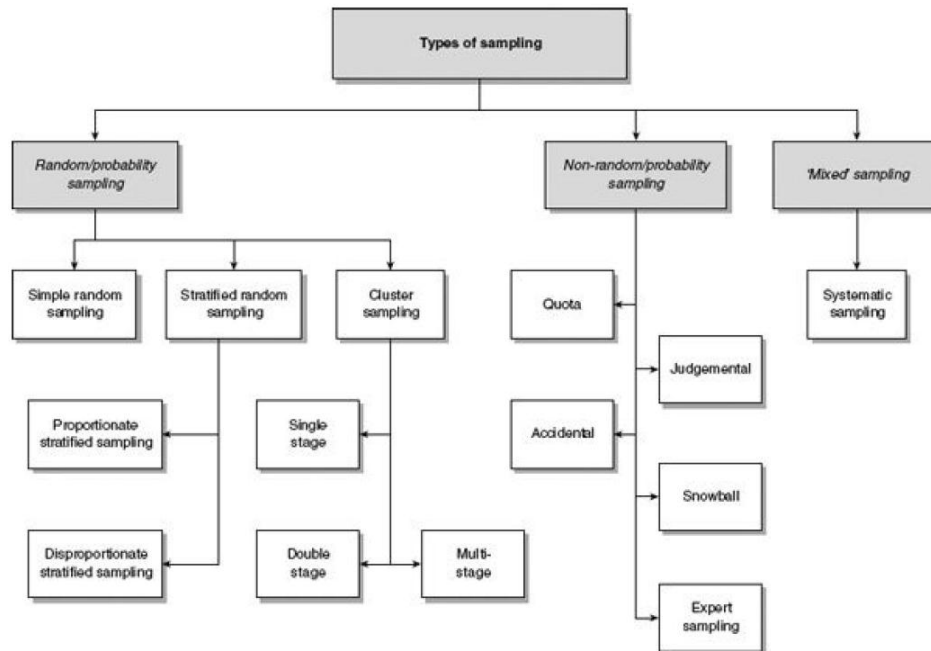
**3.6 SAMPLING METHODS / TECHNIQUES**

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There are different types of sample designs based on two factors viz., the representation basis and the element selection technique. On the representation basis, the sample may be probability sampling or it may be non-probability sampling. Probability sampling is based on the concept of

random selection, whereas non-probability sampling is ‘non-random’ sampling. On element selection basis, the sample may be either unrestricted or restricted. When each sample element is drawn individually from the population at large, then the sample so drawn is known as ‘unrestricted sample’, whereas all other forms of sampling are covered under the term ‘restricted sampling’. The following chart exhibits the sample designs as explained above.

Thus, sample designs are basically of two types viz., non-probability sampling and probability sampling. We take up these two designs separately.



**There are three commonly used types of random sampling design:**

### 1. Simple random sampling (SRS):

The most commonly used method of selecting a probability sample. In line with the definition of randomisation, whereby each element in the population is given an equal and independent chance of selection.

### 2. Stratified random sampling:

As discussed, the accuracy of your estimate largely depends on the extent of variability or heterogeneity of the study population with respect to the characteristics that have a strong correlation with what you are trying to ascertain. It follows, therefore, that if the heterogeneity in the population can be reduced by some means for a given sample size you can achieve greater accuracy in your estimate. Stratified random sampling is based upon this logic. There are two types of stratified sampling: proportionate stratified sampling and disproportionate stratified sampling. With proportionate stratified sampling, the number of elements from each stratum in relation to its proportion in the total population is selected,

whereas in disproportionate stratified sampling, consideration is not given to the size of the stratum.

### **3. Cluster sampling:**

Simple random and stratified sampling techniques are based on a researcher's ability to identify each element in a population. It is easy to do this if the total sampling population is small, but if the population is large, as in the case of a city, state or country, it becomes difficult and expensive to identify each sampling unit. In such cases the use of cluster sampling is more appropriate. Cluster sampling is based on the ability of the researcher to divide the sampling population into groups (based upon visible or easily identifiable characteristics), called clusters, and then to select elements within each cluster, using the SRS technique. Clusters can be formed on the basis of geographical proximity or a common characteristic that has a correlation with the main variable of the study (as in stratified sampling). Depending on the level of clustering, sometimes sampling may be done at different levels. These levels constitute the different stages (single, double or multiple) of clustering.

**Non-probability sampling designs** do not follow the theory of probability in the choice of elements from the sampling population. Non-probability sampling designs are used when the number of elements in a population is either unknown or cannot be individually identified. In such situations the selection of elements is dependent upon other considerations. There are five commonly used non-random designs, each based on a different consideration, which are commonly used in both qualitative and quantitative research. These are:

#### **1. Quota sampling; Quota sampling:**

The main consideration directing quota sampling is the researcher's ease of access to the sample population. In addition to convenience, you are guided by some visible characteristic, such as gender or race, of the study population that is of interest to you. The sample is selected from a location convenient to you as a researcher, and whenever a person with this visible relevant characteristic is seen that person is asked to participate in the study. The process continues until you have been able to contact the required number of respondents (quota).

#### **2. Accidental sampling:**

Accidental sampling is also based upon convenience in accessing the sampling population. Whereas quota sampling attempts to include people possessing an obvious/visible characteristic, accidental sampling makes no such attempt. You stop collecting data when you reach the required number of respondents you decided to have in your sample.

This method of sampling is common among market research and newspaper reporters. It has more or less the same advantages and disadvantages as quota sampling but, in addition, as you are not guided by

any obvious characteristics, some people contacted may not have the required information.

### **3. Judgemental sampling or Purposive sampling:**

The primary consideration in purposive sampling is your judgement as to who can provide the best information to achieve the objectives of your study. You as a researcher only go to those people who in your opinion are likely to have the required information and be willing to share it with you. This type of sampling is extremely useful when you want to construct a historical reality, describe a phenomenon or develop something about which only a little is known. This sampling strategy is more common in qualitative research, but when you use it in quantitative research you select a predetermined number of people who, in your judgement, are best positioned to provide you the needed information for your study.

### **4. Expert sampling:**

The only difference between judgemental sampling and expert sampling is that in the case of the former it is entirely your judgement as to the ability of the respondents to contribute to the study. But in the case of expert sampling, your respondents must be known experts in the field of interest to you. This is again used in both types of research but more so in qualitative research studies. When you use it in qualitative research, the number of people you talk to is dependent upon the data saturation point whereas in quantitative research you decide on the number of experts to be contacted without considering the saturation point.

You first identify persons with demonstrated or known expertise in an area of interest to you, seek their consent for participation, and then collect the information either individually or collectively in the form of a group.

### **5. Snowball sampling:**

Snowball sampling is the process of selecting a sample using networks. To start with, a few individuals in a group or organisation are selected and the required information is collected from them. They are then asked to identify other people in the group or organisation, and the people selected by them become a part of the sample. Information is collected from them, and then these people are asked to identify other members of the group and, in turn, those identified become the basis of further data collection. This process is continued until the required number or a saturation point has been reached, in terms of the information being sought.

This sampling technique is useful if you know little about the group or organisation you wish to study, as you need only to make contact with a few individuals, who can then direct you to the other members of the group. This method of selecting a sample is useful for studying communication patterns, decision making or diffusion of knowledge within a group. There are disadvantages to this technique, however. The choice of the entire sample rests upon the choice of individuals at the first stage. If they belong to a particular faction or have strong biases, the study

may be biased. Also, it is difficult to use this technique when the sample becomes fairly large.

### **Systematic sampling design: a ‘mixed’ design:**

**Systematic sampling** has been classified as a ‘mixed’ sampling design because it has the characteristics of both random and non-random sampling designs. In systematic sampling the sampling frame is first divided into a number of segments called intervals. Then, from the first interval, using the SRS technique, one element is selected. The selection of subsequent elements from other intervals is dependent upon the order of the element selected in the first interval. If in the first interval it is the fifth element, the fifth element of each subsequent interval will be chosen. Notice that from the first interval the choice of an element is on a random basis, but the choice of the elements from subsequent intervals is dependent upon the choice from the first, and hence cannot be classified as a random sample.

### **Sampling in qualitative research:**

As the main aim in qualitative enquiries is to explore the diversity, sample size and sampling strategy do not play a significant role in the selection of a sample. If selected carefully, diversity can be extensively and accurately described on the basis of information obtained even from one individual. All nonprobability sampling designs – purposive, judgemental, expert, accidental and snowball – can also be used in qualitative research with two differences:

1. In quantitative studies you collect information from a predetermined number of people but, in qualitative research, you do not have a sample size in mind. Data collection based upon a predetermined sample size and the saturation point distinguishes their use in quantitative and qualitative research.
2. In quantitative research you are guided by your desire to select a random sample, whereas in qualitative research you are guided by your judgement as to who is likely to provide you with the ‘best’ information.

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## **3.7 SAMPLING ERRORS**

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Sampling errors are the random variations in the sample estimates around the true population parameters. Since they occur randomly and are equally likely to be in either direction, their nature happens to be of compensatory type and the expected value of such errors happens to be equal to zero. Sampling error decreases with the increase in the size of the sample, and it happens to be of a smaller magnitude in case of homogeneous population.

Sampling error can be measured for a given sample design and size. The measurement of sampling error is usually called the ‘precision of the sampling plan’. If we increase the sample size, the precision can be improved. But increasing the size of the sample has its own limitations



viz., a large sized sample increases the cost of collecting data and also enhances the systematic bias. Thus the effective way to increase precision is usually to select a better sampling design which has a smaller sampling error for a given sample size at a given cost. In practice, however, people prefer a less precise design because it is easier to adopt the same and also because of the fact that systematic bias can be controlled in a better way in such a design.

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### 3.8 SUMMARY

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In quantitative research, sampling is guided by three principles, one of which is that the greater the sample size, the more accurate the estimate of the true population mean, given that everything else remains the same. The inferences drawn from a sample can be affected by both the size of the sample and the extent of variation in the sampling population. Sampling design can be classified as random/probability sampling designs, non-random/non-probability sampling designs and ‘mixed’ sampling designs. For a sample to be called a random sample, each element in the study population must have an equal and independent chance of selection. Three random designs were discussed: simple random sampling, stratified random sampling and cluster sampling. The procedures for selecting a sample using these designs were detailed step by step. The use of the fishbowl technique, the table of random numbers and specifically designed computer programs are three commonly used methods of selecting a probability sample.

There are five non-probability sampling designs: quota, accidental, judgemental, expert and snowball. Each is used for a different purpose and in different situations in both quantitative and qualitative studies. In quantitative studies their application is underpinned by the sample size whereas the data saturation point determines the ‘sample size’ in qualitative studies. Systematic sampling is classified under the ‘mixed’ category as it has the properties of both probability and non-probability sampling designs.

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### 3.9 PRACTISE QUESTIONS

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1. What do you mean by ‘Sample Design’? What points should be taken into consideration by a researcher in developing a sample design for this research project.
2. How would you differentiate between simple random sampling and complex random sampling designs? Explain clearly giving examples.
3. Why probability sampling is generally preferred in comparison to non-probability sampling? Explain the procedure of selecting a simple random sample.
4. Under what circumstances stratified random sampling design is considered appropriate? How would you select such sample? Explain by means of an example.

5. Distinguish between:
  - (a) Restricted and unrestricted sampling;
  - (b) Convenience and purposive sampling;
  - (c) Systematic and stratified sampling;
  - (d) Cluster and area sampling.
6. Under what circumstances would you recommend:
  - (a) A probability sample?
  - (b) A non-probability sample?
  - (c) A stratified sample?
  - (d) A cluster sample?
7. Explain and illustrate the procedure of selecting a random sample.
8. “A systematic bias results from errors in the sampling procedures”. What do you mean by such a systematic bias? Describe the important causes responsible for such a bias.
9. Solve the following
  - (a) The following are the number of departmental stores in 10 cities: 35, 27, 24, 32, 42, 30, 34, 40, 29 and 38. If we want to select a sample of 15 stores using cities as clusters and selecting within clusters proportional to size, how many stores from each city should be chosen? (Use a starting point of 4).
  - (b) What sampling design might be used to estimate the weight of a group of men and women?
10. A certain population is divided into five strata so that  $N_1 = 2000$ ,  $N_2 = 2000$ ,  $N_3 = 1800$ ,  $N_4 = 1700$ , and  $N_5 = 2500$ . Respective standard deviations are:  $s_1 = 1.6$ ,  $s_2 = 2.0$ ,  $s_3 = 4.4$ ,  $s_4 = 4.8$ ,  $s_5 = 6.0$  and further the expected sampling cost in the first two strata is Rs 4 per interview and in the remaining three strata the sampling cost is Rs 6 per interview. How should a sample of size  $n = 226$  be allocated to five strata if we adopt proportionate sampling design; if we adopt disproportionate sampling design considering
  - (i) only the differences in stratum variability
  - (ii) differences in stratum variability as well as the differences in stratum sampling costs.

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### 3.10 REFERENCES

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- Garg.B.L., Karadia, R., Agarwal,F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.

- Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition. New Age International Publishers, New Delhi.
- Pruzan, Peter , Research Methodology, The Aims, Practices and Ethics of Science , ISBN 978-3-319-27167-5
- Dawson, Catherine, 2002, Practical Research Methods, New Delhi, UBS Publishers Distributors
- Wadehra, B.L.2000. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
- Kumar Ranjit, 2005, Research Methodology-A Step-by-Step Guide for Beginners, (2nded), Singapore, Pearson Education

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### RESEARCH METHODOLOGY

#### Unit Structure

- 4.1 Objective
- 4.2 Introduction
- 4.3 Meaning of Research Methodology
- 4.4 Stages in Scientific Research Process: Identification and Selection of Research Problem
- 4.5 Formulation of Research Problem
- 4.6 Review of Literature
- 4.7 Formulation of Hypothesis
- 4.8 Formulation of research Design
- 4.9 Sample Design
- 4.10 Data Collection
- 4.11 Data Analysis
- 4.12 Hypothesis testing and Interpretation of Data
- 4.13 Preparation of Research Report
- 4.14 Summary
- 4.15 Practise Questions
- 4.16 References

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#### 4.1 OBJECTIVE

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- 1. Understand Research and Research Process and their types
- 2. Acquaint students with identifying problems for research
- 3. Explain the various research strategies and apply them to various research problems

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#### 4.2 INTRODUCTION

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A research methodology is an outline of how a given piece of research is carried out. It defines the techniques or procedures that are used to identify and analyse information regarding a specific research topic. The research methodology, therefore, has to do with how a researcher designs their study in a way that allows them to obtain valid and reliable results and meet their research objectives.

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## 4.3 MEANING OF RESEARCH METHODOLOGY

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“The process of deciding how to systematically design research and conduct it is called Research Methodology.”

Research methodology is a way of explaining how a researcher intends to carry out their research. It's a logical, systematic plan to resolve a research problem. A methodology details a researcher's approach to the research to ensure reliable, valid results that address their aims and objectives. It encompasses what data they're going to collect and where from, as well as how it's being collected and analyzed.

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## 4.4 STAGES IN SCIENTIFIC RESEARCH PROCESS: IDENTIFICATION AND SELECTION OF RESEARCH PROBLEM

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As a researcher, you must have often read that defining a problem is the first step in a research process. But, have you ever wondered what is meant by defining a problem. Well, it simply means that the researcher has to lay down certain boundaries within which he/she has to study the problem with a predefined objective in mind. Defining a problem is a herculean task, and this must be done intelligently to avoid confusions that arise in the research operation. Try to follow the below steps systematically to best define a problem:

### **i. State the problem in a general way:**

First state the problem in general terms with respect to some practical, scientific or intellectual interest. For this, the researcher may himself read the concerned subject matter thoroughly or take the help of the subject expert. Often, the guide states the problem in general terms; it depends on the researcher if he/she wants to narrow it down to operational terms. The problem stated should also be checked for ambiguity and feasibility.

### **ii. Understand the nature of the problem:**

The next step is to understand the nature and origin of the problem. The researcher needs to discuss the problem with those related to the subject matter in order to clearly understand the origin of the problem, its nature, objectives, and the environment in which the problem is to be studied.

### **iii. Survey the available literature:**

All available literature including relevant theories, reports, records, and other relevant literature on the problem needs to be reviewed and examined. This would help the researcher to identify the data available, the techniques that might be used, types of difficulties that may be encountered during the study, possible analytical shortcomings, and even new methods of approach to the present problem.

**iv. Go for discussions for developing ideas:**

The researcher may discuss the problem with his/her colleagues and others related to the concerned subject. This helps the researcher to generate new ideas, identify different aspects on the problem, gain suggestions and advices from others, and sharpen his focus on certain aspects within the field. However, discussions should not be limited to the problem only, but should also be related to the general approach to the problem, techniques that might be used, possible solutions, etc.

**v. Rephrase the research problem into a working proposition:**

Finally, the researcher must rephrase the problem into a working proposition. Rephrasing the problem means putting the problem in specific terms that is feasible and may help in the development of working hypotheses. Once the researcher has gone through the above steps systematically, it is easy to rephrase the problem into analytical and operational terms.

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## **4.5 FORMULATION OF RESEARCH PROBLEM**

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In research process, the first and foremost step happens to be that of selecting and properly defining a research problem. A researcher must find the problem and formulate it so that it becomes susceptible to research. Like a medical doctor, a researcher must examine all the symptoms (presented to him or observed by him) concerning a problem before he can diagnose correctly. To define a problem correctly, a researcher must know: what a problem is?

A research problem is the situation that causes the researcher to feel apprehensive, confused and ill at ease. It is the demarcation of a problem area within a certain context involving the WHO or WHAT, the WHERE, the WHEN and the WHY of the problem situation. There are many problem situations that may give rise to research. Three sources usually contribute to problem identification. Own experience or the experience of others may be a source of problem supply. A second source could be scientific literature. You may read about certain findings and notice that a certain field was not covered. This could lead to a research problem. Theories could be a third source. Shortcomings in theories could be researched. Research can thus be aimed at clarifying or substantiating an existing theory, at clarifying contradictory findings, at correcting a faulty methodology, at correcting the inadequate or unsuitable use of statistical techniques, at reconciling conflicting opinions, or at solving existing practical problems.

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## **4.6 REVIEW OF LITERATURE**

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Once the problem is formulated, a brief summary of it should be written down. It is compulsory for a research worker writing a thesis for a Ph.D. degree to write synopsis of the topic and submit it to the necessary Committee or the Research Board for approval. At this juncture 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. In this process, it should be remembered that one source will lead to another. The earlier studies, if any, which are similar to the study in and should be carefully studied. A good library will be a great help to the researcher at this stage.

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## **4.7 FORMULATION OF HYPOTHESIS**

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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. As such the manner in which research hypotheses are developed is particularly important since they provide the focal point for research. They also affect the manner in which tests must be conducted in the analysis of data and indirectly the quality of data which is required for the analysis. In most types of research, the development of working hypothesis plays an important role.

Hypothesis should be very specific and limited to the piece of research in hand because it has to be tested. The role of the hypothesis is to guide the researcher by delimiting the area of research and to keep him on the right track. It sharpens his thinking and focuses attention on the more important facets of the problem. It also indicates the type of data required and the type of methods of data analysis to be used. How does one go about developing working hypotheses? The answer is by using the following approach: a. Discussions with colleagues and experts about the problem, its origin and the objectives in seeking a solution; b. Examination of data and records, if available, concerning the problem for possible trends, peculiarities and other clues; c. Review of similar studies in the area or of the studies on similar problems; and d. Exploratory personal investigation which involves original field interviews on a limited scale with interested parties and individuals with a view to secure greater insight into the practical aspects of the problem. Thus, working hypotheses arise as a result of a-priori thinking about the subject, examination of the available data and material including related studies and the counsel of experts and interested parties. Working hypotheses are more useful when stated in precise and clearly defined terms. It may as well be remembered that occasionally we may encounter a problem where we do not need working hypotheses, especially in the case of exploratory or formulative researches which do not aim at testing the hypothesis. But as a general rule, specification of working hypotheses is another basic step of the research process in most research problems.

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## 4.8 FORMULATION OF RESEARCH DESIGN

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The research problem having been formulated in clear cut terms, the researcher will be required to prepare a research design, i.e., he will 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 minimal expenditure of effort, time and money. But how all these can be achieved depends mainly on the research purpose. Research purposes may be grouped into four categories,

- i. Exploration,
- ii. Description,
- iii. Diagnosis, and
- iv. Experimentation.

A flexible research design which provides opportunity for considering many different aspects of a problem is considered appropriate if the purpose of the research study is that of exploration. But when the purpose happens to be an accurate description of a situation or of an association between variables, the suitable design will be one that minimizes bias and maximizes the reliability of the data collected and analyses. There are several research designs, such as, experimental and non-experimental hypothesis testing. Experimental designs can be either informal designs (such as before-and-after without control-after-only with control, before-and-after with control) or formal designs (such as completely randomized design, randomized block design, Latin square design, simple and complex factorial designs), out of which the researcher must select one for his own project. The preparation of the research design, appropriate for a particular research problem, involves usually the consideration of the following:

- i. the means of obtaining the information;
- ii. the availability and skills of the researcher and his staff (if any);
- iii. explanation of the way in which selected means of obtaining information will be organized and the reasoning leading to the selection;
- iv. the time available for research; and
- v. the cost factor relating to research, i.e., the finance available for the purpose.



All the items under consideration in any field of inquiry constitute 'universe' or 'population'. A complete enumeration of all the items in the 'population' is known as a census inquiry. It can be presumed that in such an inquiry when all the items are covered no element of chance is left and highest accuracy is obtained. But in practice this may not be true. Even the slightest element of bias in such an inquiry will get larger and larger as the number of observations increases. Moreover, there is no way of checking the element of bias or its extent except through a survey or use of sample checks. Besides, this type of inquiry involves a great deal of time, money and energy. Not only this, census inquiry is not possible in practice under many circumstances. For instance, blood testing is done only on sample basis. Hence, quite often we select only a few items from the universe for our study purposes. The items so selected constitute what is technically called sample. The researcher must decide the way of selecting a sample or what is popularly known as the sample design. In other words, a sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population. Thus, the plan to select 12 of a city's 200 drugstores in a certain way constitutes a sample design. Samples can be either probability samples or nonprobability samples. With probability samples each element has a known probability of being included in the sample but the non-probability samples do not allow the researcher to determine this probability. Probability samples are those based on simple random sampling, systematic sampling, stratified sampling, cluster/area sampling whereas non-probability samples are those based on convenience sampling, judgment sampling and quota sampling techniques. A brief mention of the important sample designs is as follows:

### **a. Deliberate sampling:**

Deliberate sampling is also known as purposive or nonprobability sampling. This sampling method involves purposive or deliberate selection of particular units of the universe for constituting a sample which represents the universe. When population elements are selected for inclusion in the sample based on the ease of access, it can be called convenience sampling. If a researcher wishes to secure data from, say, gasoline buyers, he may select a fixed number of petrol stations and may conduct interviews at these stations. This would be an example of convenience sample of gasoline buyers. At times such a procedure may give very biased results particularly when the population is not homogeneous. On the other hand, in judgment sampling the researcher's judgment is used for selecting items which he considers as representative of the population. For example, a judgment sample of college students might be taken to secure reactions to a new method of teaching. Judgment sampling is used quite frequently in qualitative research where the desire happens to be to develop hypotheses rather than to generalize to larger populations.

**b. Simple random sampling:**

This type of sampling is also known as chance sampling or probability sampling where each and every item in the population has an equal chance of inclusion in the sample and each one of the possible samples, in case of finite universe, has the same probability of being selected. For example, if we have to select a sample of 300 items from a universe of 15,000 items, then we can put the names or numbers of all the 15,000 items on slips of paper and conduct a lottery. Using the random number tables is another method of random sampling. To select the sample, each item is assigned a number from 1 to 15,000. Then, 300 five digits random numbers are selected from the table. To do this we select some random starting point and then a systematic pattern is used in proceeding through the table. We might start in the 4th row, second column and proceed down the column to the bottom of the table and then move to the top of the next column to the right. When a number exceeds the limit of the numbers in the frame, in our case over 15,000, it is simply passed over and the next number selected that does fall within the relevant range. Since the numbers were placed in the table in a completely random fashion, the resulting sample is random. This procedure gives each item an equal probability of being selected. In case of infinite population, the selection of each item in a random sample is controlled by the same probability and that successive selections are independent of one another.

**c. Systematic sampling:**

In some instances the most practical way of sampling is to select every 15th name on a list, every 10th house on one side of a street and so on. Sampling of this type is known as systematic sampling. An element of randomness is usually introduced into this kind of sampling by using random numbers to pick up the unit with which to start. This procedure is useful when sampling frame is available in the form of a list. In such design the selection process starts by picking some random point in the list and then every  $n$ th element is selected until the desired number is secured.

**d. Stratified sampling:**

If the population from which a sample is to be drawn does not constitute homogeneous group, then stratified sampling technique is applied so as to obtain representative sample. In this technique, the population is stratified into a number of non-overlapping subpopulations or strata and sample items are selected from each stratum. If the items selected from each stratum is based on simple random sampling the entire procedure, first stratification and then simple random sampling, is known as stratified random sampling.

**e. Quota sampling:**

In stratified sampling the cost of taking random samples from individual strata is often so expensive that interviewers are simply given quota to be filled from different strata, the actual selection of items for sample being left to the interviewer judgment. This is called quota sampling. The size of

the quota for each stratum is generally proportionate to the size of that stratum in the population. Quota sampling is thus an important form of non-probability sampling. Quota samples generally happen to be judgment samples rather than random samples.

#### **f. Cluster sampling and area sampling:**

Cluster sampling involves grouping the population and then selecting the groups or the clusters rather than individual elements for inclusion in the sample. Suppose some departmental store wishes to sample its credit card holders. It has issued its cards to 15,000 customers. The sample size is to be kept say 450. For cluster sampling this list of 15,000 card holders could be formed into 100 clusters of 150 cardholders each. Three clusters might then be selected for the sample randomly. The sample size must often be larger than the simple random sample to ensure the same level of accuracy because in cluster sampling procedural potential for order bias and other sources of error is usually accentuated. The clustering approach can, however, make the sampling procedure relatively easier and increase the efficiency of field work, specially in the case of personal interviews. Area sampling is quite close to cluster sampling and is often talked about when the total geographical area of interest happens to be big one. Under area sampling we first divide the total area into a number of smaller non-overlapping areas, generally called geographical clusters, then a number of these smaller areas are randomly selected, and all units in these small areas are included in the sample. Area sampling is specially helpful where we do not have the list of the population concerned. It also makes the field interviewing more efficient since interviewer can do many interviews at each location.

#### **g. Multi-stage sampling:**

This is a further development of the idea of cluster sampling. This technique is meant for big inquiries extending to a considerably large geographical area like an entire country. Under multi-stage sampling the first stage may be to select large primary sampling units such as states, then districts, then towns and finally certain families within towns. If the technique of random sampling is applied at all stages, the sampling procedures described as multi-stage random sampling.

#### **h. Sequential sampling:**

This is somewhat a complex sample design where the ultimate size of the sample is not fixed in advance but is determined according to mathematical decisions on the basis of information yielded as survey progresses. This design is usually adopted under acceptance sampling plan in the context of statistical quality control.

In practice, several of the methods of sampling described above may well be used in the same study in which case it can be called mixed sampling. It may be pointed out here that normally one should resort to random sampling so that bias can be eliminated and sampling error can be estimated. But purposive sampling is considered desirable when the

universe happens to be small and a known characteristic of it is to be studied intensively. Also, there are conditions under which sample designs other than random sampling may be considered better for reasons like convenience and low costs. The sample design to be used must be decided by the researcher taking into consideration the nature of the inquiry and other related factors.

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#### **4.10 DATA COLLECTION**

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In dealing with any real-life problem, it is often found that data at hand are inadequate, and hence, it becomes necessary to collect data that are appropriate. There are several ways of collecting the appropriate data which differ considerably in context of money costs, time and other resources at the disposal of the researcher. Primary data can be collected either through experiment or through survey. If the researcher conducts an experiment, he observes some quantitative measurements, or the data, with the help of which he examines the truth contained in his hypothesis. But in the case of a survey, data can be collected by any one or more of the following ways:

##### **i. By observation:**

This method implies the collection of information by way of investigator's own observation, without interviewing the respondents. The information obtained relates to what is currently happening and is not complicated by either the past behaviour or future intentions or attitudes of respondents. This method is no doubt an expensive method and the information provided by this method is also very limited. As such this method is not suitable in inquiries where large samples are concerned.

##### **ii. Through personal interview:**

The investigator follows a rigid procedure and seeks answers to a set of pre-conceived questions through personal interviews. This method of collecting data is usually carried out in a structured way where output depends upon the ability of the interviewer to a large extent.

##### **iii. Through telephone interviews:**

This method of collecting information involves contacting the respondents on telephone itself. This is not a very widely used method but it plays an important role in industrial surveys in developed regions, particularly, when the survey has to be accomplished in a very limited time.

##### **iv. Through schedules:**

Under this method the enumerators are appointed and given training. They are provided with schedules containing relevant questions. These enumerators go to respondents with these schedules. Data are collected by filling up the schedules by enumerators on the basis of replies given by respondents. Much depends upon the capability of enumerators so far as

this method is concerned. Some occasional field checks on the work of the enumerators may ensure sincere work.

The researcher should select one of these methods of collecting the data taking into consideration the nature of investigation, objective and scope of the inquiry, financial resources, available time and the desired degree of accuracy. Though he should pay attention to all these factors but much depends upon the ability and experience of the researcher. In this context Dr ALGOL very aptly remarks that in collection of statistical data common sense is the chief requisite and experience is the chief teacher.

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## 4.11 DATA ANALYSIS

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After the data have been collected, the researcher turns to the task of analyzing them. 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 inferences. The unwieldy data should necessarily be condensed into a few manageable groups and tables for further analysis. Thus, researcher should classify the raw data into some purposeful and usable categories. Coding operation is usually done at this stage through which the categories of data are transformed into symbols that may be tabulated and counted. Editing is the procedure that improves the quality of the data for coding. With coding the stage is ready for tabulation. Tabulation is a part of the technical procedure wherein the classified data are put in the form of tables. The mechanical devices can be made use of at this juncture. A great deal of data, especially in large inquiries, is tabulated by computers. Computers not only save time but also make it possible to study large number of variables affecting a problem simultaneously. 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 or differences supporting or conflicting with original or new hypotheses should be subjected to tests of significance to determine with what validity data can be said to indicate any conclusion(s). For instance, if there are two samples of weekly wages, each sample being drawn from factories indifferent parts of the same city, giving two different mean values, then our problem may be whether the two mean values are significantly different or the difference is just a matter of chance. Through the use of statistical tests we can establish whether such a difference is a real one or is the result of random fluctuations. If the difference happens to be real, the inference will be that the two samples Research come from different universes and if the difference is due to chance, the conclusion would be that the two samples belong to the same universe. Similarly, the technique of analysis of variance can help us in analyzing whether three or more varieties of seeds grown on certain fields yield significantly different results or not. In brief, the researcher can analyze the collected data with the help of various statistical measures.

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## 4.12 HYPOTHESIS TESTING AND INTERPRETATION OF DATA

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After analyzing the data as stated above, the researcher is in a position to test the hypotheses, if any, he had formulated earlier. Do the facts support the hypotheses or they happen to be contrary? This is the usual question which should be answered while testing hypotheses. Various tests, such as Chi square test, t-test, F-test, have been developed by statisticians for the purpose. The hypotheses may be tested through the use of one or more of such tests, depending upon the nature and object of research inquiry. Hypothesis -testing will result in either accepting the hypothesis or in rejecting it. If the researcher had no hypotheses to start with, generalizations established on the basis of data may be stated as hypotheses to be tested by subsequent researches in times to come.

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. The process of interpretation may quite often trigger off new questions which in turn may lead to further researches.

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## 4.13 PREPARATION OF RESEARCH REPORT

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Finally, the researcher has to prepare the report of what has been done by him. Writing of report must be done with great care keeping in view the following: The layout of the report should be as follows:

- i. the preliminary pages;
- ii. the main text, and
- iii. the end matter.

In its preliminary pages the report should carry title and date followed by acknowledgement and foreword. Then there should be a table of contents followed by a list of tables and list of graphs and charts, if any, given in the report. The main text of the report should have the following parts: Introduction: It should contain a clear statement of the objective of the research and an explanation of the methodology adopted in accomplishing the research. The scope of the study along with various limitations should as well be stated in this part. Summary of findings: After introduction there would appear a statement of finding and recommendations in non-technical language. If the findings are extensive, they should be summarized. Main report: The main body of the report should be presented in logical sequence and broken-down into readily identifiable sections. Conclusion: Towards the end of the main text, researcher should again put down the results of his research clearly and precisely. In fact, it is the final summing up. At the end of the report, appendices should be enlisted in respect of all technical data. Bibliography, i.e., list of books,

journals, reports, etc., consulted, should also be given in the end. Index should also be given specially in a published research report. Report should be written in a concise and objective style in simple language avoiding vague expressions such as 'it seems,' 'there may be', and the like. Charts and illustrations in the main report should be used only if they present the information more clearly and forcibly. Calculated 'confidence limits' must be mentioned and the various constraints experienced in conducting research operations may as well be stated.

### **Criteria of Good Research:**

Whatever may be the types of research and studies; one thing that is important is that they all meet on the common ground of scientific method employed by them. One expects scientific research to satisfy the following criteria:

1. The purpose of the research should be clearly defined and common concepts bemused.
2. The research procedure used should be described in sufficient detail to permit another researcher to repeat the research for further advancement, keeping the continuity of what has already been attained.
3. The procedural design of the research should be carefully planned to yield results that areas objective as possible.
4. The researcher should report with complete frankness, flaws in procedural design and estimate their effects upon the findings.
5. 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.
6. 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.
7. Greater confidence in research is warranted if the researcher is experienced, has a good reputation in research and is a person of integrity.

**In other words, we can state the qualities of a good research as under:**

#### **1. Good research is systematic:**

It means that research is structured with specified steps to be taken in a specified sequence in accordance with the well defined set of rules. Systematic characteristic of the research does not rule out creative thinking but it certainly does reject the use of guessing and intuition in arriving at conclusions.

**2. Good research is logical:**

This implies that research is guided by the rules of logical reasoning and the logical process of induction and deduction are of great value in carrying out research. Induction is the process of reasoning from a part to the whole whereas deduction is the process of reasoning from some premise to a conclusion which follows from that very premise. In fact, logical reasoning makes research more meaningful in the context of decision making.

**3. Good research is empirical:**

It implies that research is related basically to one or more aspects of a real situation and deals with concrete data that provides a basis for external validity to research results.

**4. Good research is replicable:**

This characteristic allows research results to be verified by replicating the study and thereby building a sound basis for decisions.

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**4.14 SUMMARY**

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Research papers, dissertations, thesis, academic journal articles, or any other piece of formal research will contain a section (or chapter) on research methodology. This section stipulates the methodological choices made and also substantiates why these choices were made. This section is therefore used by researchers to justify why the methods they employed are best suited to achieve the research objective and arrive at valid and reliable results. This section also allows readers to evaluate the reliability and validity of a study based on the relevance and effectiveness of the procedures employed.

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**4.15 PRACTISE QUESTIONS**

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1. Define research methodology. Also explain its meaning.
2. list and explain the stages in Scientific Research Process.
3. What are the stages in formulating research problem? Explain each in details.
4. Write a short note on the
  - a. importance of review of literature in research.
  - b. Formulation of Hypothesis
  - c. Formulation of Research Design
  - d. Sample Design
  - e. Data Collection



5. Explain the different types of sample selection techniques.
6. What are the different sections of a research report? Explain.
7. List the criteria of a good research.

**Project Work:**

1. Visit the college library or nearby research centre or from internet collect 5 titles of research papers/thesis and classify them according to types of research, discuss how the problems are delineated, how they are relevant to scientific method etc.
2. Identify 2 researchable problems relevant to your context and knowledge disciplines and justify the significance of their study.
3. Preparation of a review article.
4. Identification of variables of a research study and their classification in terms of functions and level of measurement.
5. Preparation of a sampling design given the objectives and research questions/hypotheses of a research study.
6. Preparation of questionnaire for micro-level educational survey.
7. Prepare a proposal on an identified research problem.

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**4.16 REFERENCES**

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- Garg B. L., Karadia R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
- Kothari, C. R. (2008). Research Methodology: Methods and Techniques. Second Edition. New Age International Publishers, New Delhi.
- Pruzan, Peter, Research Methodology, The Aims, Practices and Ethics of Science, ISBN 978-3-319-27167-5
- Dawson, Catherine, 2002, Practical Research Methods, New Delhi, UBS Publishers Distributors
- Kumar Ranjit, 2005, Research Methodology-A Step-by-Step Guide for Beginners, (2nded), Singapore, Pearson Education

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## FORMULATING RESEARCH PROBLEM

### Unit Structure

- 5.1 Objective
- 5.2 Introduction
- 5.3 Considerations:
  - 5.3.1 Relevance
  - 5.3.2 Interest,
  - 5.3.3 Data Availability
- 5.4 Choice of data
- 5.5 Analysis of data
- 5.6 Generalization and Interpretation of analysis
- 5.7 Summary
- 5.8 Practise Questions
- 5.9 References

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### 5.1 OBJECTIVE

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1. Understand Research and Research Process and their types
2. Acquaint students with identifying problems for research
3. Explain the various research strategies and apply them to various research problems

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### 5.2 INTRODUCTION

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In research process, the first and foremost step happens to be that of selecting and properly defining a research problem. A researcher must find the problem and formulate it so that it becomes susceptible to research. Like a medical doctor, a researcher must examine all the symptoms (presented to him or observed by him) concerning a problem before he can diagnose correctly. To define a problem correctly, a researcher must know: what a problem is?

A research problem, in general, refers to some difficulty which a researcher experiences in the context of either a theoretical or practical situation and wants to obtain a solution for the same.

Usually we say that a research problem does exist if the following conditions are met with:

- (i) There must be an individual (or a group or an organisation), let us call it 'I,' to whom the problem can be attributed. The individual or the organisation, as the case may be, occupies an environment, say 'N', which is defined by values of the uncontrolled variables,  $Y_j$ .
- (ii) There must be at least two courses of action, say C1 and C2, to be pursued. A course of action is defined by one or more values of the controlled variables. For example, the number of items purchased at a specified time is said to be one course of action.
- (iii) There must be at least two possible outcomes, say O1 and O2, of the course of action, of which one should be preferable to the other. In other words, this means that there must be at least one outcome that the researcher wants, i.e., an objective.
- (iv) The courses of action available must provides some chance of obtaining the objective, but they cannot provide the same chance, otherwise the choice would not matter.

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### 5.3 CONSIDERATIONS:

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#### 5.3.1 Relevance:

Select a topic that is of relevance to you as a professional. Ensure that your study adds to the existing body of knowledge, bridges current gaps or is useful in policy formulation. This will help you to sustain interest in the study.

#### 5.3.2 Interest:

Interest should be the most important consideration in selecting a research problem. A research endeavour is usually time consuming, and involves hard work and possibly unforeseen problems. If you select a topic which does not greatly interest you, it could become extremely difficult to sustain the required motivation and put in enough time and energy to complete it.

#### 5.3.3 Data Availability:

If your topic entails collection of information from secondary sources (office records, client records, census or other already-published reports, etc.) make sure that this data is available and, in the format, you want before finalising your topic.

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### 5.4 CHOICE OF DATA

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The task of data collection begins after a research problem has been defined and research design/plan chalked out. While deciding about the method of data collection to be used for the study, the researcher should keep in mind two types of data viz., primary and secondary. The primary data are those which are collected afresh and for the first time, and thus happen to be original in character. The secondary data, on the other hand, are those which have already been collected by someone else and which

have already been passed through the statistical process. The researcher would have to decide which sort of data he would be using (thus collecting) for his study and accordingly he will have to select one or the other method of data collection. The methods of collecting primary and secondary data differ since primary data are to be originally collected, while in case of secondary data the nature of data collection work is merely that of compilation. There are several methods of collecting primary data, particularly in surveys and descriptive researches. Important ones are: (i) observation method, (ii) interview method, (iii) through questionnaires, (iv) through schedules, and (v) other methods which include (vi) warranty cards; (vii) distributor audits; (viii) pantry audits; (ix) consumer panels; (x) using mechanical devices; (xi) through projective techniques; (xii) depth interviews, and (xiii) content analysis.

#### **(i) Observation method:**

The observation method is the most commonly used method specially in studies relating to behavioural sciences. In a way we all observe things around us, but this sort of observation is not scientific observation. Observation becomes a scientific tool and the method of data collection for the researcher, when it serves a formulated research purpose, is systematically planned and recorded and is subjected to checks and controls on validity and reliability. Under the observation method, the information is sought by way of investigator's own direct observation without asking from the respondent. However, observation method has various limitations. Firstly, it is an expensive method. Secondly, the information provided by this method is very limited. Thirdly, sometimes unforeseen factors may interfere with the observational task. At times, the fact that some people are rarely accessible to direct observation creates obstacle for this method to collect data effectively. While using this method, the researcher should keep in mind things like: What should be observed? How the observations should be recorded? Or how the accuracy of observation can be ensured? In case the observation is characterised by a careful definition of the units to be observed, the style of recording the observed information, standardised conditions of observation and the selection of pertinent data of observation, then the observation is called as structured observation. But when observation is to take place without these characteristics to be thought of in advance, the same is termed as unstructured observation. Structured observation is considered appropriate in descriptive studies, whereas in an exploratory study the observational procedure is most likely to be relatively unstructured.

#### **(ii) interview method:**

The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses. This method can be used through personal interviews and, if possible, through telephone interviews.

**(a) Personal interviews:**

Personal interview method requires a person known as the interviewer asking questions generally in a face-to-face contact to the other person or persons. (At times the interviewee may also ask certain questions and the interviewer responds to these, but usually the interviewer initiates the interview and collects the information.) This sort of interview may be in the form of direct personal investigation or it may be indirect oral investigation. In the case of direct personal investigation, the interviewer has to collect the information personally from the sources concerned. He has to be on the spot and has to meet people from whom data have to be collected.

This method is particularly suitable for intensive investigations.

Despite the variations in interview-techniques, the major advantages and weaknesses of personal interviews can be enumerated in a general way. The chief merits of the interview method are as follows:

- (i) More information and that too in greater depth can be obtained.
- (ii) Interviewer by his own skill can overcome the resistance, if any, of the respondents; the interview method can be made to yield an almost perfect sample of the general population.
- (iii) There is greater flexibility under this method as the opportunity to restructure questions is always there, specially in case of unstructured interviews.
- (iv) Observation method can as well be applied to recording verbal answers to various questions.
- (v) Personal information can as well be obtained easily under this method.
- (vi) Samples can be controlled more effectively as there arises no difficulty of the missing returns; non-response generally remains very low.
- (vii) The interviewer can usually control which person(s) will answer the questions. This is not possible in mailed questionnaire approach. If so desired, group discussions may also be held.

**(b) Telephone interviews:**

This method of collecting information consists in contacting respondents on telephone itself. It is not a very widely used method, but plays important part in industrial surveys, particularly in developed regions. The chief merits of such a system are:

1. It is more flexible in comparison to mailing method.
2. It is faster than other methods i.e., a quick way of obtaining information.

3. It is cheaper than personal interviewing method; here the cost per response is relatively low.
4. Recall is easy; callbacks are simple and economical.
5. There is a higher rate of response than what we have in mailing method; the non-response is generally very low.
6. Replies can be recorded without causing embarrassment to respondents.
7. Interviewer can explain requirements more easily.
8. At times, access can be gained to respondents who otherwise cannot be contacted for one reason or the other.
9. No field staff is required.
10. Representative and wider distribution of sample is possible.

**(iii) Questionnaires:**

This method of data collection is quite popular, particularly in case of big enquiries. It is being adopted by private individuals, research workers, private and public organisations and even by governments. In this method a questionnaire is sent (usually by post) to the persons concerned with a request to answer the questions and return the questionnaire. A questionnaire consists of a number of questions printed or typed in a definite order on a form or set of forms. The questionnaire is mailed to respondents who are expected to read and understand the questions and write down the reply in the space meant for the purpose in the questionnaire itself. The respondents have to answer the questions on their own.

The method of collecting data by mailing the questionnaires to respondents is most extensively employed in various economic and business surveys. The merits claimed on behalf of this method are as follows:

1. There is low cost even when the universe is large and is widely spread geographically.
2. It is free from the bias of the interviewer; answers are in respondents' own words.
3. Respondents have adequate time to give well thought out answers.
4. Respondents, who are not easily approachable, can also be reached conveniently.
5. Large samples can be made use of and thus the results can be made more dependable and reliable.

Before using this method, it is always advisable to conduct 'pilot study' (Pilot Survey) for testing the questionnaires. In a big enquiry the significance of pilot survey is felt very much. Pilot survey is infact the replica and rehearsal of the main survey. Such a survey, being conducted by experts, brings to the light the weaknesses (if any) of the questionnaires and also of the survey techniques. From the experience gained in this way, improvement can be effected.

Main aspects of a questionnaire: Quite often questionnaire is considered as the heart of a survey operation. Hence it should be very carefully constructed. If it is not properly set up, then the survey is bound to fail. This fact requires us to study the main aspects of a questionnaire viz., the general form, question sequence and question formulation and wording. Researcher should note the following with regard to these three main aspects of a questionnaire:

### **1. General form:**

So far as the general form of a questionnaire is concerned, it can either be structured or unstructured questionnaire. Structured questionnaires are those questionnaires in which there are definite, concrete and pre-determined questions. The questions are presented with exactly the same wording and in the same order to all respondents. Resort is taken to this sort of standardisation to ensure that all respondents reply to the same set of questions. The form of the question may be either closed (i.e., of the type 'yes' or 'no') or open (i.e., inviting free response) but should be stated in advance and not constructed during questioning. Structured questionnaires may also have fixed alternative questions in which responses of the informants are limited to the stated alternatives. Thus a highly structured questionnaire is one in which all questions and answers are specified and comments in the respondent's own words are held to the minimum.

### **2. Question sequence:**

In order to make the questionnaire effective and to ensure quality to the replies received, a researcher should pay attention to the question-sequence in preparing the questionnaire. A proper sequence of questions reduces considerably the chances of individual questions being misunderstood. The question-sequence must be clear and smoothly-moving, meaning thereby that the relation of one question to another should be readily apparent to the respondent, with questions that are easiest to answer being put in the beginning. The first few questions are particularly important because they are likely to influence the attitude of the respondent and in seeking his desired cooperation. The opening questions should be such as to arouse human interest. The following type of questions should generally be avoided as opening questions in a questionnaire:

1. questions that put too great a strain on the memory or intellect of the respondent;

2. questions of a personal character;
3. questions related to personal wealth, etc.

### **3. Question formulation and wording:**

With regard to this aspect of questionnaire, the researcher should note that each question must be very clear for any sort of misunderstanding can do irreparable harm to a survey. Question should also be impartial in order not to give a biased picture of the true state of affairs. Questions should be constructed with a view to their forming a logical part of a well thought out tabulation plan. In general, all questions should meet the following standards—(a) should be easily understood; (b) should be simple i.e., should convey only one thought at a time; (c) should be concrete and should conform as much as possible to the respondent's way of thinking.

Essentials of a good questionnaire: To be successful, questionnaire should be comparatively short and simple i.e., the size of the questionnaire should be kept to the minimum. Questions should proceed in logical sequence moving from easy to more difficult questions. Personal and intimate questions should be left to the end. Technical terms and vague expressions capable of different interpretations should be avoided in a questionnaire. Questions may be dichotomous (yes or no answers), multiple choice (alternative answers listed) or open-ended. The latter type of questions are often difficult to analyse and hence should be avoided in a questionnaire to the extent possible. There should be some control questions in the questionnaire which indicate the reliability of the respondent.

For instance, a question designed to determine the consumption of particular material may be asked first in terms of financial expenditure and later in terms of weight. The control questions, thus, introduce a cross-check to see whether the information collected is correct or not. Questions affecting the sentiments of respondents should be avoided. Adequate space for answers should be provided in the questionnaire to help editing and tabulation. There should always be provision for indications of uncertainty, e.g., "do not know," "no preference" and so on. Brief directions with regard to filling up the questionnaire should invariably be given in the questionnaire itself. Finally, the physical appearance of the questionnaire affects the cooperation the researcher receives from the recipients and as such an attractive looking questionnaire, particularly in mail surveys, is a plus point for enlisting cooperation. The quality of the paper, along with its colour, must be good so that it may attract the attention of recipients.

#### **iv) through schedules:**

This method of data collection is very much like the collection of data through questionnaire, with little difference which lies in the fact that schedules (proforma containing a set of questions) are being filled in by the enumerators who are specially appointed for the purpose. These enumerators along with schedules, go to respondents, put to them the questions from the proforma in the order the questions are listed and



record the replies in the space meant for the same in the proforma. In certain situations, schedules may be handed over to respondents and enumerators may help them in recording their answers to various questions in the said schedules. Enumerators explain the aims and objects of the investigation and also remove the difficulties which any respondent may feel in understanding the implications of a particular question or the definition or concept of difficult terms.

**(v) warranty cards:**

Warranty cards are usually postal sized cards which are used by dealers of consumer durables to collect information regarding their products. The information sought is printed in the form of questions on the 'warranty cards' which is placed inside the package along with the product with a request to the consumer to fill in the card and post it back to the dealer.

**(vi) distributor audits:**

Distributor or store audits are performed by distributors as well as manufacturers through their salesmen at regular intervals. Distributors get the retail stores audited through salesmen and use such information to estimate market size, market share, seasonal purchasing pattern and so on. The data are obtained in such audits not by questioning but by observation. For instance, in case of a grocery store audit, a sample of stores is visited periodically and data are recorded on inventories on hand either by observation or copying from store records. Store audits are invariably panel operations, for the derivation of sales estimates and compilation of sales trends by stores are their principal 'raison d'être'. The principal advantage of this method is that it offers the most efficient way of evaluating the effect on sales of variations of different techniques of in-store promotion.

**(vii) pantry audits:**

Pantry audit technique is used to estimate consumption of the basket of goods at the consumer level. In this type of audit, the investigator collects an inventory of types, quantities and prices of commodities consumed. Thus in pantry audit data are recorded from the examination of consumer's pantry. The usual objective in a pantry audit is to find out what types of consumers buy certain products and certain brands, the assumption being that the contents of the pantry accurately portray consumer's preferences. Quite often, pantry audits are supplemented by direct questioning relating to reasons and circumstances under which particular products were purchased in an attempt to relate these factors to purchasing habits. A pantry audit may or may not be set up as a panel operation, since a single visit is often considered sufficient to yield an accurate picture of consumers' preferences. An important limitation of pantry audit approach is that, at times, it may not be possible to identify consumers' preferences from the audit data alone, particularly when promotion devices produce a marked rise in sales.

**(viii) consumer panels:**

An extension of the pantry audit approach on a regular basis is known as 'consumer panel', where a set of consumers are arranged to come to an understanding to maintain detailed daily records of their consumption and the same is made available to investigator on demands. It is essentially a sample of consumers who are interviewed repeatedly over a period of time. Mostly consume panels are of two types viz., the transitory consumer panel and the continuing consumer panel. A transitory consumer panel is set up to measure the effect of a particular phenomenon. Usually such a panel is conducted on a before-and-after-basis. Initial interviews are conducted before the phenomenon takes place to record the attitude of the consumer. A second set of interviews is carried out after the phenomenon has taken place to find out the consequent changes that might have occurred in the consumer's attitude. It is a favourite tool of advertising and of social research. A continuing consumer panel is often set up for an indefinite period with a view to collect data on a particular aspect of consumer behaviour over time, generally at periodic intervals or may be meant to serve as a general purpose panel for researchers on a variety of subjects. Such panels have been used in the area of consumer expenditure, public opinion and radio and TV listenership etc.

**(ix) using mechanical devices:**

The use of mechanical devices has been widely made to collect information by way of indirect means. Eye camera, Pupilometric camera, Psychogalvanometer, Motion picture camera and Audiometer are the principal devices so far developed and commonly used by modern big business houses, mostly in the developed world for the purpose of collecting the required information.

**(x) Through projective techniques:**

Projective techniques (or what are sometimes called as indirect interviewing techniques) for the collection of data have been developed by psychologists to use projections of respondents for inferring about underlying motives, urges, or intentions which are such that the respondent either resists to reveal them or is unable to figure out himself. In projective techniques the respondent in supplying information tends unconsciously to project his own attitudes or feelings on the subject under study. Projective techniques play an important role in motivational researches or in attitude surveys. The use of these techniques requires intensive specialised training. In such techniques, the individual's responses to the stimulus-situation are not taken at their face value. The stimuli may arouse many different kinds of reactions. The nature of the stimuli and the way in which they are presented under these techniques do not clearly indicate the way in which the response is to be interpreted. The stimulus may be a photograph, a picture, an inkblot and so on. Responses to these stimuli are interpreted as indicating the individual's own view, his personality structure, his needs, tensions, etc. in the context of some pre-

established psychological conceptualisation of what the individual's responses to the stimulus mean.

Some important projective techniques are Word association tests, Sentence completion tests, Story completion tests, Verbal projection tests, Pictorial techniques etc.

**(xi) Depth interviews:**

Depth interviews are those interviews that are designed to discover underlying motives and desires and are often used in motivational research. Such interviews are held to explore needs, desires and feelings of respondents. In other words, they aim to elicit unconscious as also other types of material relating especially to personality dynamics and motivations. As such, depth interviews require great skill on the part of the interviewer and at the same time involve considerable time. Unless the researcher has specialised training, depth interviewing should not be attempted.

**(xii) Content analysis**

Content-analysis consists of analysing the contents of documentary materials such as books, magazines, newspapers and the contents of all other verbal materials which can be either spoken or printed. Content-analysis prior to 1940's was mostly quantitative analysis of documentary materials concerning certain characteristics that can be identified and counted. But since 1950's content-analysis is mostly qualitative analysis concerning the general import or message of the existing documents. "The difference is somewhat like that between a casual interview and depth interviewing." Bernard Berelson's name is often associated with the latter type of content analysis. "Content-analysis is measurement through proportion.... Content analysis measures pervasiveness and that is sometimes an index of the intensity of the force."

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## **5.5 ANALYSIS OF DATA**

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Data analysis in general terms, describe the strategy you intend to use for data analysis. Specify whether the data will be analysed manually or by computer. For computer analysis, identify the program and where appropriate the statistical procedures you plan to perform on the data. For quantitative studies also identify the main variables for cross-tabulation.

For qualitative studies, describe how you plan to analyse your interviews or observation notes to draw meanings from what your respondents have said about issues discussed or observation notes made.

One of the common techniques is to identify main themes, through analysing the contents of the information gathered by you in the field. You first need to decide whether you want to analyse this information manually or use a computer program for the purpose.

**There are three ways to proceed with content analysis:**

1. From your field notes develop a framework of your write-up and as you go through your notes directly integrate that information within the structure developed. If you adopt this method, you need to be reasonably clear about the structure. It does not mean that you cannot develop the structure as you go on analysing; still, a clear vision will be of immense help in slotting information gathered in the field by you into the write-up.
2. The second method is that you transcribe your field notes to be read by you over and over again to identify the main themes. These themes become the basis of your write-up.
3. There are computer programs such as NUD\*IST, Ethnograph, NVivo specifically designed to handle descriptive data. You may prefer to use one of these programs. These programs are also based upon the principle of content analysis. The only difference is that instead of your searching manually, they identify where a particular text identifying the theme appears.

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## **5.6 GENERALIZATION AND INTERPRETATION OF ANALYSIS**

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Generalization - is a statement that seems to be true in most situations or for most people, but that may not be completely true in all cases. -Collins English Dictionary- Interpretation-is a communication process, designed to reveal meanings and relationships of our cultural and natural heritage, through involvement with objects, artifacts, landscapes and sites. -John A. Veverka- Definition of Generalization and Interpretation. Generalization, which is an act of reasoning that involves drawing broad inferences from particular observations, is widely-acknowledged as a quality standard in quantitative research, but is more controversial in qualitative research. The goal of most qualitative studies is not to generalize but rather to provide a rich, contextualized understanding of some aspect of human experience through the intensive study of particular cases. Yet, in an environment where evidence for improving practice is held in high esteem, generalization in relation to knowledge claims merits careful attention by both qualitative and quantitative researchers.

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. The process of interpretation may quite often trigger off new questions which in turn may lead to further researches.

Consideration for Generalization of Results Making generalization of the Research Findings Speculations or Assumptions not supported by findings

must be avoided Opinionated statements or inconclusive and sweeping statements not supported by research evidence must also be avoided

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## 5.7 SUMMARY

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A research problem is the situation that causes the researcher to feel apprehensive, confused and ill at ease. It is the demarcation of a problem area within a certain context involving the WHO or WHAT, the WHERE, the WHEN and the WHY of the problem situation. There are many problem situations that may give rise to research. Three sources usually contribute to problem identification. Own experience or the experience of others may be a source of problem supply. A second source could be scientific literature. You may read about certain findings and notice that a certain field was not covered. This could lead to a research problem. Theories could be a third source. Shortcomings in theories could be researched. Research can thus be aimed at clarifying or substantiating an existing theory, at clarifying contradictory findings, at correcting a faulty methodology, at correcting the inadequate or unsuitable use of statistical techniques, at reconciling conflicting opinions, or at solving existing practical problems.

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## 5.8 PRACTISE QUESTIONS

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1. Describe fully the techniques of defining a research problem.
2. What is research problem? Define the main issues which should receive the attention of the researcher in formulating the research problem. Give suitable examples to elucidate your points.
3. How do you define a research problem? Give three examples to illustrate your answer.
4. What is the necessity of defining a research problem? Explain.
5. Write short notes on:
  - (a) Experience survey;
  - (b) Pilot survey;
  - (c) Components of a research problem;
  - (d) Rephrasing the research problem.
6. “The task of defining the research problem often follows a sequential pattern”. Explain.
7. “Knowing what data are available often serves to narrow down the problem itself as well as the technique that might be used.” Explain the underlying idea in this statement in the context of defining a research problem.

8. Write a comprehensive note on the “Task of defining a research problem”.
9. Prepare a Research case study for the following:
  - (a) Voter turnout in Ward XX has been decreasing, in contrast to the rest of the municipal corporation.
  - (b) What communication strategies can political parties apply to increase the voter turnout among people between the age of 25-30?
  - (c) Mobile App of online E-Commerce firm has a high staff turnover rate, affecting productivity and team cohesion.
  - (d) Non-profit organization YY faces a funding gap that means some of its programs will have to be cut.
  - (e) The effects of long-term Vitamin D deficiency on cardiovascular health are not well understood.
  - (f) The relationship between gender, race and income inequality has yet to be closely studied in the context of the millennial gig economy.
  - (g) How do low-income earning people feel about the healthcare system, and how does the Indian and the US compare?
  - (h) What effect does using Facebook everyday have on teenagers?

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## 5.9 REFERENCES

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- Garg.B.L., Karadia, R., Agarwal,F. and Agarwal, U.K. An introduction to Research Methodology, RBSA Publishers.
- Kothari, C. R. Research Methodology: Methods and Techniques. Second Edition. New Age International Publishers, New Delhi.
- Pruzan, Peter, Research Methodology, The Aims, Practices and Ethics of Science , ISBN 978-3-319-27167-5
- Dawson, Catherine, Practical Research Methods, New Delhi, UBS Publishers Distributors
- Wadehra, B.L. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
- Kumar Ranjit, Research Methodology-A Step-by-Step Guide for Beginners , (2nded), Singapore, Pearson Education

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## OUTCOME OF RESEARCH

### Unit Structure

- 6.0 Objective
- 6.1 Introduction
- 6.2 Report writing
- 6.3 Layout of report writing
- 6.4 Report conclusion
- 6.5 Ethical issues in research report
  - 6.5.1 The Importance of Research Ethics
  - 6.5.2 Code of Ethics
- 6.6 Research recommendation
- 6.7 Research suggestions
- 6.8 Summary
- 6.9 Unit End Exercise
- 6.10 References

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### 6.0 OBJECTIVE

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This chapter will able you to understand the following concept:

- Identify key reference, structure and style of the report or proposal.
- The connection between the proposal and report.
- Identify the readers need and accordingly plan and organize a report or proposal by and formulate the main message of the document;
- Developing an outline by arranging the ideas in support of the purpose and main message;
- Summarization of the main ideas of report or proposal to write a notes and that helps others to convey the main message of the content;
- Apply key elements of structure and style in drafting longer documents;
- Comparison of the strategies which are helpful for conveying information with text and visually;
- Revise documents according to standard principles of structure, style, and English-language mechanics.

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## 6.1 INTRODUCTION

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In This module it takes reader through the process of producing a report or proposal. The reader will consider this as shorter documents like briefing notes. The overall structure of the module can get through this module.

The first section will begin with the, Prewriting, and here your planning is beginning. Here the purpose of the document in depth will be determine by the writer and analysis of its intended readers. Here the development of a main message is done and prepare writer for the organizing and drafting phases.

After the prewriting stage writer work with the Organizing and Drafting, here writer need to cover all the core areas of a typical report or proposal in which introductions, conclusions, recommendations, and summaries are included.

In drafting section, the use of visual representations of information such as tables, charts, graphs, and images are also considered. Here the writer will revise and polish the corresponding parts of assignment report or add visual information if it is not included in your initial draft.

After getting the text polished the further section is Revising, here writer need to focus on the completion of the task and its proper distribution. And then need to do Proofreading which is again glance of the document and apply the techniques.

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## 6.2 REPORT WRITTING

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### **Report writing tasks:**

Reports and proposals are in different in nature and also have their unique characteristics. these characteristics and styles vary depending on the audience for the report or proposal. The document should be written by keeping a thought in mind that., as soon as the reader red the content he should know the main ideas behind the content and he himself find useful the document is.

### **The skills required for the report writing:**

- one should be determining the purpose of the document;
- one should make study of audience and writing to a range of readers;
- also should done the planning, organizing and focusing of job allotted;
- determining flow between parts and tying ideas together;
- writing clear, concise, appropriate and accurate text based on quantifiable data;
- selecting appropriate graphics to assist the reader;



- editing and proofreading;
- summarizing (for either actual summaries or for condensing large amounts of information into confined spaces).

### **Report writing includes following steps:**

1. Logical analysis of the subject-matter;
2. Preparation of the final outline;
3. Preparation of the rough draft;
4. Rewriting and polishing;
5. Preparation of the final bibliography;
6. Writing the final draft.

#### **1. Logical analysis of the subject-matter:**

- the analysis is used to made the logical development on the basis of mental connections and associations between the one thing and another.
- Chronological development is responsible for a connection or sequence in time or occurrence.

#### **Preparation of the final outline:**

- “Outlines are the framework upon which long written works are constructed.

#### **Preparation of the rough draft:**

- In this stage the researcher sits to glance what he has done in the context of his research study.
- the procedure is written by himself which adopted during the whole content writing and also in collecting the material for his study along with various limitations faced by him,

#### **Rewriting and polishing:**

- the time consuming stage where the content is polished and reframe as per the reader need.
- in this stage the weaknesses in logical development or presentation are consider and rewrite

#### **final bibliography:**

- The list of books is written down in the bibliography at the end of the report

- during the assignment the researcher has taken the help of books and some other resources that should contain in this.
- the arrangement is alphabetically.
- Divided into two parts:
- The first part may contain the names of books and pamphlets, and
- The second part may contain the names of magazine and newspaper articles.

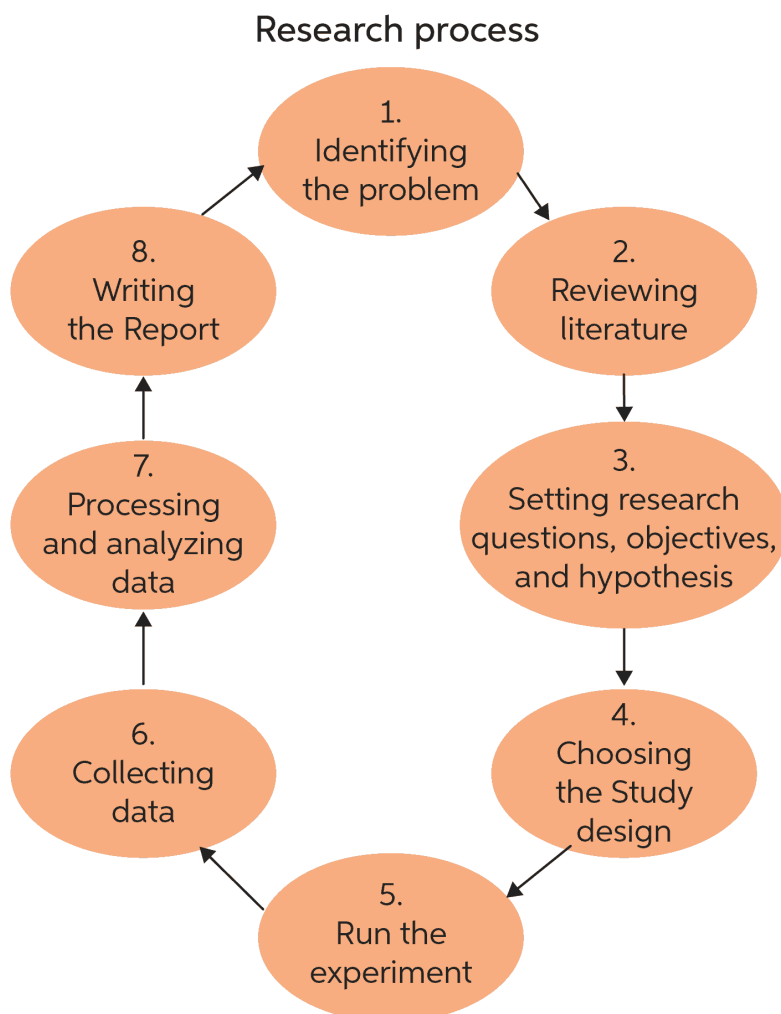
### Writing the final draft:

- The final draft should be written in a concise and objective style and in simple language, avoiding vague expressions such as “it seems”, “there may be”, and the like ones.
- While writing the final draft, the researcher must avoid abstract terminology and technical jargon.

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## 6.3 LAYOUT OF REPORT WRITING

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Finally, the researcher made a report of what has been done during the assignment. Writing of report is are and it must be done with keeping some points in mind. it should start with the date and followed by title page.

**The layout of the report should be as follows:**

- The preliminary pages;
- The main text,
- The end matter

**1. The preliminary pages:**

- these pages are first pages which are also called as preliminary pages. While writing the report in preliminary pages the title and date, followed by acknowledgements in the form of 'Preface' or 'Foreword' Should be there.
- Then it should be followed by table of content and the list of figures and illustrations so that the decision-maker or anybody interested in reading the report can easily locate the required information in the report.

**2. The main Text:**

The main text is responsible for the complete outline of the research report along with all details. the main text is follow with the Title of the research study which is repeated at the top of the first page and some other details are also there which include pages' numbers. Each main section of the report should begin on a new page.

**The main text has following sections:**

- **Introduction:** in this section the clear concept of the study followed by the objective of the research and an explanation of the methodology adopted in accomplishing the research are explained. The scope of the study is also defined under this section along with various limitations.
- **Summary of findings:** After getting introduction finished the findings and recommendations in non-technical language are include in the summary with the title called as summary or conclusion.
- **Main report:** The main report of the research study should be presented in logical sequence and broken-down into readily identifiable sections.
- **Conclusion:** in conclusion also the clear findings and methodology used are put down the with the results, the researcher clearly and precisely mentioned the findings. Or he final summing up the content.

### 3. The end matter:

- Appendices should be list down at the end of the report, and also all the technical data such as questionnaires, sample information, mathematical derivations and the like ones should be written.
- Bibliography of sources, i.e., list of books, journals, reports, etc., should also be given.
- Index (the short forms used in the article with its long from, an alphabetical listing of names, places and topics along with the numbers of the pages in a book or report on which they are mentioned or discussed) should be given at the end of the report.

Report should be written in a concise and objective style in simple language avoiding vague expressions such as ‘it seems,’ ‘there may be’, and the like. The Charts and illustrations can be used in main report if they present the information more clearly and forcibly. Calculated ‘confidence limits’ must be mentioned and the various constraints experienced in conducting research operation.

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## 6.4 REPORT CONCLUSION

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The Reports should always contain the conclusion that are primarily analytical. The recommendations are also combined with the reports. The Proposals are used to give the final word to the readers and also often give conclusions as it is having an impact at the end of the proposal is important. The summary is also called as conclusion. As well as large sections of major reports are also including conclusions. Sometime a chapter can also be conclusion chapter as some long reports are there. For every chapter there is a conclusion.

The main messages of the document enable you to reinforce the conclusion. The summary of the whole document is known as conclusion, it may have drawing inferences from the entire process about what has been found, or decided, and the impact of those findings or decisions.

A conclusion is needed even in a short report as it is useful. A good conclusion can make a good reputation of the organization. If it is written well, it helps reader to read the content easily. All the threads of the chapter put together to make a good conclusion, and relate them to the initial purpose for writing the report. In other words, the conclusion should confirm for the reader that the report's purpose has been achieved.

Depending on the research topic and the style of research or methodology, the researcher tries to choose the conclusion according to specific types.

### Types of Conclusion:

#### Summarizing conclusion:

To giving a clear summary of the main idea or points of research topic or thesis a summarizing conclusion is used. It used widely in today's world

as it is common form of conclusion, though some research papers may require a different style of conclusion. Summarizing conclusion is used in all common types of research papers such as problem and solution research, argumentative papers and scientific and historical topics.

### **Externalizing conclusion:**

In some cases, the researcher may not present some points or idea directly there he can use an externalizing conclusion to presents points or ideas relevant to the research and thesis. However, in this type of conclusion the way of presenting the research is very effective, because they present new ideas that build off of the topic you initially presented in research. Externalizing conclusions get readers thinking in new directions about the impacts of your topic.

### **Editorial conclusion:**

In an editorial conclusion, the researcher is presenting his own concluding ideas or commentary in report. This type of conclusion connects the thoughts of the researcher with presentation. The researcher might state the feeling about outcomes, results or the topic in general. The editorial conclusion can work especially well in research papers that present opinions, take a humanistic approach to a topic or present controversial information.

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## **6.5 ETHICAL ISSUES IN RESEARCH REPORT**

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Many people are willing to disclose a lot of personal information during our research so we need to make sure that we treat both the participants and the information they provide with honesty and respect. This is called research ethics.

Overt research researchers should be open and honest about who they are and what they're doing. People can then make an informed choice about whether they take part in a project. It is their choice to refuse – nobody should be forced or bullied. If so, then they will not be willing to participate and may cause problems for you by offering false or useless information

### **6.5.1 The Importance of Research Ethics:**

- For expanding the knowledge, the researcher promotes the aims of research.
- The researcher also supports the values of collaborative work of available resources, and mutual respect and fairness between them. This is very important as scientific research depends on collaboration between researchers and groups.
- The research ethics are responsible for researcher's actions during the projects. Many researchers are supported by public money, and regulations on conflicts of interest, misconduct, and research

involving humans or animals are necessary to ensure that money is spent appropriately.

- The research ethics are also responsible for getting trust for researcher. Then the people will support and fund research as per their wants, for that they must be confident about the research and researcher.
- The research ethics are getting through the social and moral values, such as the principle of doing no harm to others.

### **1. Treating Participants with Respect:**

while writing a researcher must remember that research process introduces to many people or participants of different age, social status or position of powerlessness they may be vulnerable. The researcher need to be very careful when the participants are young, then we need to make sure a parent or guardian is present. Whereas If participants are ill or reaching old age we might need to use a proxy and care should be taken to make sure that we do not affect the relationship between the proxy and the participant. Some people may desire for monetary benefits for participation but some may not in favor of that. Hence the researcher should not give any rise to false hopes.

### **2. Overt and Covert Research:**

The open research that is openly available in public and everyone knows about the researcher and its work this process is called as Overt researcher. Whereas the research which is not known by anyone or publicly what the researcher is doing this stage is called as Covert research. Covert research is often muddled/misinterpreted with deception, and condemned as intrinsically unethical.

#### **6.5.2 Code of ethics:**

1. Anonymity
2. Confidentiality
3. Your right to comment
4. The final report
5. Data Protection

- **Anonymity:** this says that the researcher makes guarantee about the names and addresses are not used anywhere in the final report, or store or categories information using names and addresses.
- **Confidentiality:** this ethic says that researcher will take care of not disclosing any information in the group or any third parties directly, unless permission has been granted to do so.

- **Your right to comment:** this research ethics says that at any stage if you wish to comment on the emerging results or final report you may do so. I agree to listen to your comments and make relevant alterations, if appropriate.
- **The final report:** at this stage the final report is available to all the authorities like any organization, university library and the who has taken part in the research who has requested a copy. The final copy along with its many copies are sent to the authorities.
- **Data Protection:** The Data Protection Act 1998 came into force on 1 March 2000. The act is held responsible for setting the rules for processing personal information and applies to paper records as well as those held on computers. It covers issues such as acting fairly and lawfully; not keeping the information longer than necessary; making sure that the data is accurate and kept secure.

**Many or even most ethical codes cover the following areas:**

### **1. Honesty and Integrity:**

In this stage of ethics, the researcher should do their work honestly, i.e the content the images, tables, data results and methods which he applies for the research purpose that should be not published hence before anywhere else. Whenever the researcher uses the data which is already published it is good ethics to acknowledge that person. Here researcher should not use any other data on his or her name and sell the content. In such case they should made an agreement between them to clear rules.

### **2. Objectivity:**

Here the researcher should try to avoid the bias in any aspect of your research, including design, data analysis, interpretation, and peer review. For instance, in many case the researcher approaches a person who is families with himself for review purpose or the person who is worked with himself which is against the ethics. As per human tendency the person who know the researcher is not able to find out the faults done by his friend. Hence the researcher should try to ensure that no groups are inadvertently excluded from your research. This also means that you need to disclose any personal or financial interests that may affect your research.

### **3. Carefulness:**

While working on report researcher should be always careful to avoid careless mistakes. In this stage he is responsible for personal review his work carefully and critically to ensure that your results are credible. It is also important to keep full records of your research. If you are asked to act as a peer reviewer, you should take the time to do the job effectively and fully.

**4. Openness:**

The researcher should always be prepared to share his data and results, along with any new tools that has been developed by him, when he publishes his findings in newspaper, magazine or any other documents, this helps to further knowledge and advance science. The researcher should be open to criticism and new ideas.

**5. Respect for Intellectual Property:**

The researcher should never plagiarise, or copy, other people's work and try to pass it off as your own. He should always ask for permission before using other people's tools or methods, unpublished data or results. Not doing so is plagiarism. Obviously, the researcher need to respect copyrights and patents, together with other forms of intellectual property, and always acknowledge contributions to your research. If in doubt, acknowledge, to avoid any risk of plagiarism.

**6. Confidentiality:**

Researcher should respect anything that has been provided in confidence. he should also follow guidelines on protection of sensitive information such as patient records.

**7. Responsible Publication:**

The researcher should publish to advance to state of research and knowledge, and not just to advance your career. This means, in essence, that he should not publish anything that is not new, or that duplicates someone else's work.

**8. Legality:**

Researcher should always be aware of laws and regulations that govern your work, and be sure that you conform to them.

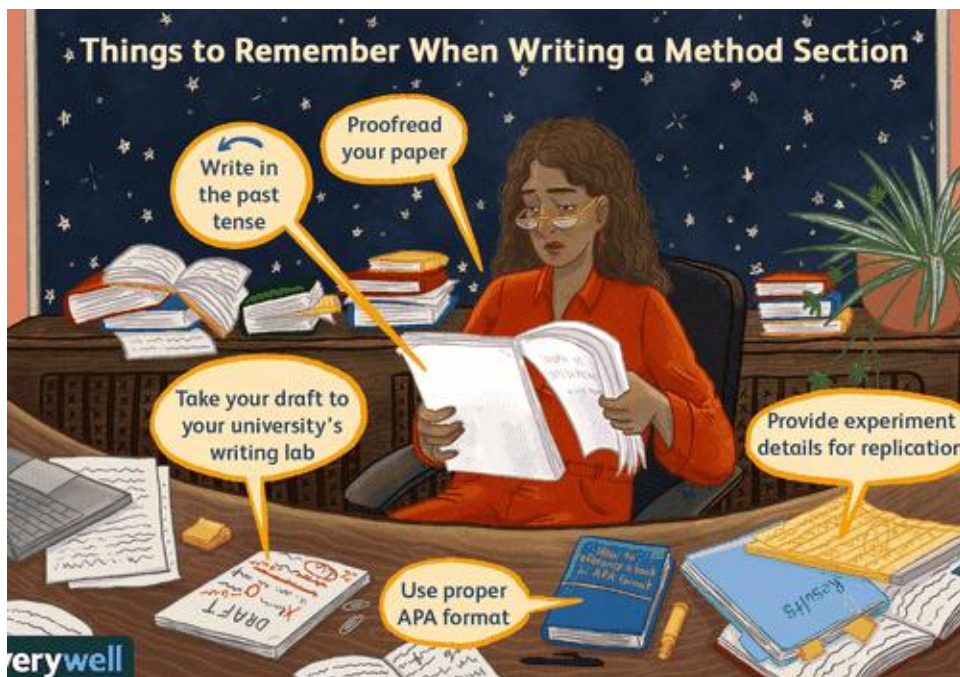
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**6.6 REPORT RECOMMENDATIONS**

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Recommendations are having different purpose in report but also they are always included with a report's conclusion. Conclusion is always gives you the main or core idea about the content it also offers you the opportunity to summarize or review your main ideas, whereas recommendations suggest actions to be taken in response to the findings of a report. You can regard recommendations as a prompt to action for your readers. As the researcher states in planning, the structure of report also should lead up to the recommendations and provide justification for them. Just as a proposal grows from your project's goals and objectives, a report should actually grow backwards from your recommendations. Having your recommendations accepted then becomes part of your purpose.





### What makes a good recommendation? Effective recommendations:

- describe a suggested course of action to be taken to solve a particular problem;
- are written as action statements without justification;
- are stated in clear, specific language;
- should be expressed in order of importance;
- are based on the case built up in the body of the report; are written in parallel structure.

A word of caution about writing recommendations: you should always consider your relationship with the reader first. If you have no authority to make recommendations, the reader may be hostile to their presence.

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## 6.7 REPORT SUGGESTIONS

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The research future scope dissertation needs to include suggestions in report. Depending on requirements, suggestions for future research can be either integrated into Research Limitations section or it can be a separate section.

### Following are some 4-5 suggestions for future studies:

1. **Building upon findings of your research.** These things are relating to findings of the researcher study. In addition, the researcher may suggest future research to address unanswered aspects the research problem.

2. **Addressing limitations of your research.** The researcher need to take the help of limitations and these may relate to formulation of research aim and objectives, application of data collection method, sample size, scope of discussions and analysis etc. the researcher can propose future research suggestions that address the limitations of your study.
3. **Constructing the same research in a new context,** location and/or culture. It is most likely that the researcher addressed research problem within the settings of specific context, location and/or culture. Accordingly, he can propose future studies that can address the same research problem in a different setting, context, location and/or culture.
4. **Re-assessing and expanding theory,** framework or model you have addressed in your research. Future studies can address the effects of specific event, emergence of a new theory or evidence and/or other recent phenomenon on your research problem.

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## 6.8 SUMMARY

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This module has will let you know the entire process for report/proposal writing from the initial planning stages to final proofreading. Along with this process, one should also have reviewed the content, data methods and applied the techniques you learned there: techniques like prewriting, outlining, paragraph writing, drafting, and revising.

The researcher should give importance to planning and organizing their thoughts and ideas for their report or proposal. The researcher has to begin outlining the report with a clear idea of the purpose and main message. With this it helps to proceed to the next step in the planning process—outlining your document before you begin drafting.

### **Drafting involves two main tasks:**

1. preparing each section of your document, like the introduction, conclusion, recommendations, and summary, and
2. composing clear and coherent paragraphs and correct sentences.

As you revise your report or proposal, be aware of the rules of mechanics used to ensure the quality and consistency of written materials at WHO. Be sure to use WHO-recommended reference texts, such as style guides, guidelines, and dictionaries or the resources recommended or required by your donors (e.g. the Gates Foundation, Bloomberg Foundation, the European Commission). The final stage of reviewing your document involves a close look at the details of style and mechanics.

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## 6.9 UNIT AND EXERCISE

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Outcome of Research

1. Explain the layout of the report.
2. Write a note on code of ethics
3. What is effective report writing?
4. Write a note on a report conclusion.
5. Write some suggestions and recommendations of good research report writing.
6. Write down the ethics of good report writing

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## 6.10 REFERENCES

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- Dawson, Catherine, 2002, Practical Research Methods, New Delhi, UBS Publishers Distributors.
- Kothari, C.R.1985, Research Methodology-Methods and Techniques, New Delhi, Wiley Eastern Limited.
- Kumar Ranjit, 2005, Research Methodology-A Step-by-Step Guide for Beginners, (2nded), Singapore, Pearson Education

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## **OUTCOME OF RESEARCH**

### **Unit Structure**

- 7.0 Objective
- 7.1 Introduction
- 7.2 Characteristics of an Effective Research Report
- 7.3 Types of research report
- 7.4 Example of research report
- 7.5 Mechanics of effective research writing report
- 7.6 Precautions for writing research report
- 7.7 Summary
- 7.8 Unit End Exercise
- 7.9 References

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### **7.0 OBJECTIVE**

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This chapter will able you to understand the following concept:

- Effective research writing.
- The example of proposal and report.
- Characteristics of research report
- Mechanics used for writing effective research report
- Precautions for writing effective research report

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### **7.1 INTRODUCTION**

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After collecting and analysing the data, the researcher has to accomplish the task of drawing inferences followed by report writing. This has to be done very carefully, otherwise it can mislead the reader. The purpose of the report writing is mentioned clearly by the researcher in the report. It is essential for the simple reason that usefulness and utility of research findings lie in proper interception. all the analytical information and consequential inference may well have designed in the report. The report may be tested with the hypothesis. the reader is reading the research report to convey about the studies and must add the knowledge to the reader's view. Research report is one of the summarization form of the whole subject.

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## 7.2 RESEARCH REPORT CHARACTERISTICS

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Outcome of Research

### Characteristics of an Effective Research Report

1. Focus: It emphasizes the imperative information.
2. Accuracy: It does not deceive the reader.
3. Clarity: It does not baffle the reader.
4. Conciseness: It does not fritter away the reader's time.

The research report helps the researcher to carry the study and table the content used in the research as it compels him to imagine in systematic manner about what the researcher wants to study. He starts with the introductory segment of the report and end on conclusion. He starts writing the report with the small results and analysis and draw a conclusion with analysing the data.

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## 7.3 TYPES OF RESEARCH REPORT

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With the help of some special characteristics, a report writing can be of a definite kind. For example, the format of the report in the office recognized contexts may not be apposite with the report made in meeting. In that case, even if your report is on the summit and the best, just the structure or format or language could effort against the report.



### 1. Long Report and Short Reports:

Some reports are long in nature which is prepared by the third party whereas some of the reports are small in nature as this report is made by inside employee of the organization. This type of report is generally clear and concise in nature. Short term report can be of 2-3 pages with all important points covered. In some cases, the long report can be splitting into different short reports.

## **2. Internal and External Reports:**

As the name implies internal report made by internal or in-house employees or organization and hence report stays within a definite organization or faction of people. The internal report held with the office scenery, internal reports are for within the institute. Whereas the external report is done with the external experts, such as a news report in the newspaper about a happening or the yearly reports of companies for distribution exterior to the organization. The public report is also called as external reports.

## **3. Vertical and Lateral Reports:**

The upward and downward communication is present in the organization. Thus the reports are also existing in the vertical and lateral format. When the report is for your administration or for your mentees, it's a perpendicular report. Wherever a track of upwards or downwards comes into the suggestion, we call it a vertical report. On the other hand, Lateral reports, lend a hand in harmonization within the organization. A report traveling in the identical unit of organization level.

## **4. Periodic Reports:**

This type of reports is generally preparing as per the periods. Sometime the period may be of quarter, semester or year, in some cases the period may be daily or weekly. These reports are sent out on frequently pre-scheduled dates decides by the organization.

## **5. Formal and Informal Reports:**

There are again two type of report formal and informal. Formal reports follow some structured. They specifically focus on the detachment and organization, enclose a deeper aspect, and the writer must write them in a style that abolishes factors like personal pronouns. The short messages are frequently informal reports with free-flowing, relaxed use of language. We commonly describe the domestic report/memorandum as an informal report.

## **6. Informational and Analytical Reports:**

The example of Informational reports are attendance reports, annual budget reports, monthly financial reports, etc. lug intentional information from one area of an organization to maybe a superior system. Analytical reports like scientific research, feasibility reports, and employee assessment show attempts to resolve genuine problems. These analytical reports usually necessitate suggestions at the closing stages.

## **7. Proposal Reports:**

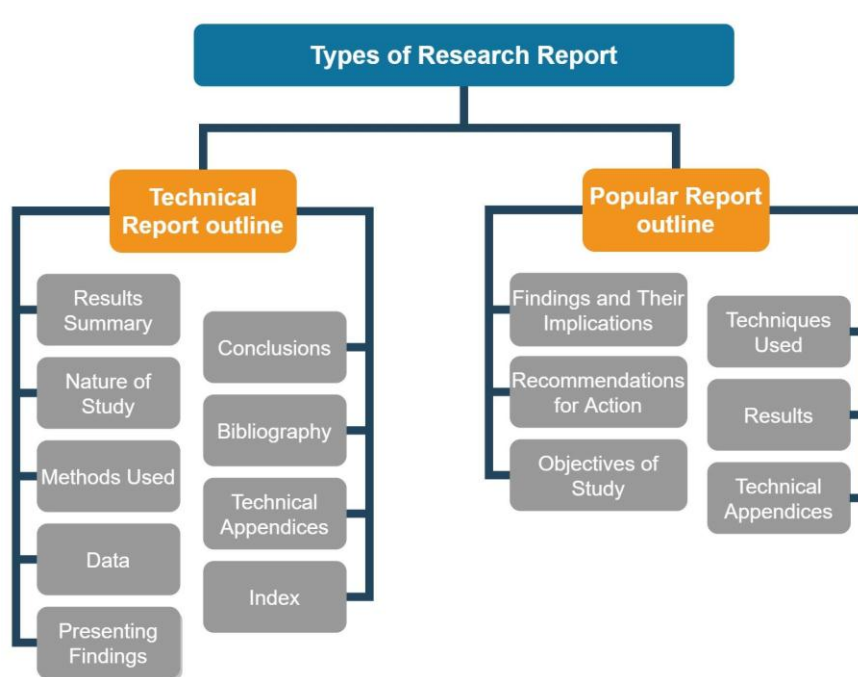
These kinds of reports are known as problem solving report and it lean-to to the analytical. It defined the solution of the problem in which the organization is arrived. It also defines some precautionary measures to

prevent the problem. The end target is usually very solution-tilting. The another term for this type of report is proposal reports.

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## 8. Functional Reports:

These kinds of reports comprise marketing reports, fiscal reports, accounting reports, and a range of other reports that supply a function solely. By and large, we can contain almost all reports in most of these categories. Moreover, we can embrace a particular report on numerous kinds of reports.



### Technical Report:

In the technical report the main emphasis is on i. the methods employed, ii. assumptions made in the course of the study, iii. the detailed presentation of the findings including their limitations and supporting data.

**A general outline of a technical report can be as follows:**

Summary of results:	• A brief review of the main findings just in two or three pages.
Nature of the study:	• Description of the general objectives of study, formulation of the problem in operational terms, the working hypothesis, the type of analysis and data required, etc.
Methods employed:	• Specific methods used in the study and their limitations. For instance, in sampling studies we should give details of sample design viz., sample size, sample selection, etc.
Data:	• Discussion of data collected, their sources, characteristics and limitations. If secondary data are used, their suitability to the problem at hand be fully assessed. In case of a survey, the manner in which data were collected should be fully described.
Analysis of data and presentation of findings:	• The analysis of data and presentation of the findings of the study with supporting data in the form of tables and charts be fully narrated. This, in fact, happens to be the main body of the report usually extending over several chapters.
Conclusions:	• A detailed summary of the findings and the policy implications drawn from the results be explained.
Bibliography:	• Bibliography of various sources consulted be prepared and attached.
Technical appendices:	• Appendices be given for all technical matters relating to questionnaire, mathematical derivations, elaboration on particular technique of analysis and the like ones.
Index:	• Index must be prepared and be given invariably in the report at the end.

The order presented above only gives a general idea of the nature of a technical report; the order of presentation may not necessarily be the same in all the technical reports. This, in other words, means that the presentation may vary in different reports; even the different sections outlined above will not always be the same, nor will all these sections appear in any particular report. It should, however, be remembered that even in a technical report, simple presentation and ready availability of the findings remain an important consideration and as such the liberal use of charts and diagrams is considered desirable.

**Popular Report:**

The popular report is one which gives emphasis on simplicity and attractiveness. The simplification should be sought through clear writing, minimization of technical, particularly mathematical, details and liberal use of charts and diagrams. Attractive layout along with large print, many subheadings, even an occasional cartoon now and then is another characteristic feature of the popular report. Besides, in such a report emphasis is given on practical aspects and policy implications. We give below a general outline of a popular report.

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**7.4 EXAMPLES OF RESEARCH REPORT**

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**Example 1: SHORT REPORT:**

The following conclusion is from a 5-page article in Bulletin of the WHO in which the authors propose the use of a new framework for monitoring and evaluation for health workers. It is not a proposal in the sense of seeking funding but rather strives to propose and promote a different way of thinking to guide managers, policymakers, and evaluators. As with the first example, the headings are included to give some indication of the structure of the document.

This framework proposes a common approach to facilitate the evaluation and monitoring of interventions to increase access to health workers in underserved areas. It suggests that a comprehensive approach needs to be used for the design, implementation, monitoring, evaluation, and review of such interventions. The framework is not intended to be prescriptive and can be applied flexibly to each country context. It is hoped that it will promote the use of a common understanding/logic on how attraction and retention interventions work, using a systems perspective. It starts with a common set of indicators, which enable comparison between various cases, and facilitates reviews of published studies. As	Increasing access to health workers in underserved areas: A conceptual framework for measuring results <ul style="list-style-type: none"><li>• Introduction</li><li>• Challenges in evaluation</li><li>• Conceptual framework<ul style="list-style-type: none"><li>o Design</li><li>o Implementation</li><li>o Results</li></ul></li></ul>
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such it can be used to monitor and evaluate interventions, either using a method-based or a theory-based evaluation approach with a specific set of indicators.	<ul style="list-style-type: none"> <li>o Monitoring</li> <li>• The way forward</li> </ul>
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## 7.5 MECHANICS OF WRITING A RESEARCH REPORT

The good researcher must follow some mechanics to or set of rules which should be followed in the actual preparation of the research report or paper. Once the techniques are finally decided, then the report can be a good report as it states the reputation of the organization. The following mechanics are taken into consideration while writing a research report:



### 1. Size and physical design:

The manuscript should be written on unruled paper 8 1/2 × 11 in size. If it is to be written by hand, then black or blue-black ink should be used. A margin of at least one and one-half inches should be allowed at the left hand and of at least half an inch at the right hand of the paper. There should also be one-inch margins, top and bottom. The paper should be neat and legible. If the manuscript is to be typed, then all typing should be double-spaced on one side of the page only except for the insertion of the long quotations.

### 2. Procedure:

While writing a report various steps of writing the good report should be strictly adhered.

### 3. Layout:

The layout of the report is decided in this section with keeping in mind the objective and nature of the problem, the layout of the report should be decided and accordingly adopted as the problem occurs.

### 4. Treatment of quotations:

Quotations should be placed in quotation marks and double spaced, forming an immediate part of the text. But if a quotation is of a considerable length (more than four or five type written lines) then it should be single-spaced and indented at least half an inch to the right of the normal text margin.

### 5. The footnotes:

- The footnotes are used in two purposes, it gives the identification of materials used in quotations in the report and the second purpose is to notice of materials which are not immediately necessary to the body of the research text but still of supplemental value. In the other term the footnotes are used for cross references, citation of authorities and sources, acknowledgement and elucidation or explanation of a point of view. The researcher should always keep in mind that footnote is not making end of the report nor it display of scholarship.
- The place of Footnotes is always at the bottom of the page on which the reference or quotation which they identify or supplement ends. The textual material is not considered as Footnotes whereas it customarily separated from the textual material by a space of half an inch and a line about one and a half inches long.
- Footnotes should be numbered consecutively, usually beginning with 1 in each chapter separately. The number should be put slightly above the line, say at the end of a quotation. At the foot of the page, again, the footnote number should be indented and typed a little above the line. Thus, consecutive numbers must be used to correlate the reference in the text with its corresponding note at the bottom of the page, except in case of statistical tables and other numerical material, where symbols such as the asterisk (\*) or the like one may be used to prevent confusion.
- Footnotes are always typed in single space though they are divided from one another by double space.

### 6. Documentation style:

Regarding documentation, the first footnote reference to any given work should be complete in its documentation, giving all the essential facts about the edition used. Such documentary footnotes follow a general sequence. The common order may be described as under:

### **Regarding the single-volume reference:**

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1. Author's name in normal order (and not beginning with the last name as in a bibliography) followed by a comma;
2. Title of work, underlined to indicate italics;
3. Place and date of publication;
4. Pagination references (The page number).

### **Regarding periodicals reference:**

1. Name of the author in normal order;
2. Title of article, in quotation marks;
3. Name of periodical, underlined to indicate italics;
4. Volume number;
5. Date of issuance;
6. Pagination.

Regarding anthologies and collections reference Quotations from anthologies or collections of literary works must be acknowledged not only by author, but also by the name of the collector.

#### **1. Regarding second-hand quotations reference:**

Original author and title;

“quoted or cited in,”;

Second author and work.

#### **2. Case of multiple authorship:**

This case arises when the author or the editor is multiple. In such a case the documentation the name of only the first given and the multiple authorship is indicated by “et al.” or “and others”. If the work is cited again without any other work intervening, it may be indicated as *ibid*, followed by a comma and the page number. A single page should be referred to as p., but more than one page be referred to as pp. If there are several pages referred to at a stretch, the practice is to use often the page number, for example, pp. 190ff, which means page number 190 and the following pages; but only for page 190 and the following page ‘190f’. Roman numerical is generally used to indicate the number of the volume of a book. *Op. cit.* (opera citato, in the work cited) or *Loc. cit.* (loco citato, in the place cited) are two of the very convenient abbreviations used in the footnotes. *Op. cit.* or *Loc. cit.* after the writer's name would suggest that the reference is to work by the writer which has been cited in detail in an earlier footnote but intervened by some other references.

**3. Punctuation and abbreviations in footnotes:**

The first item after the number in the footnote is the author's name, given in the normal signature order. This is followed by a comma. After the comma, the title of the book is given: the article (such as "A", "An", "The" etc.) is omitted and only the first word and proper nouns and adjectives are capitalized. The title is followed by a comma. Information concerning the edition is given next. This entry is followed by a comma. The place of publication is then stated; it may be mentioned in an abbreviated form, if the place happens to be a famous one such as Lond. for London, N.Y. for New York, N.D. for New Delhi and so on. This entry is followed by a comma. Then the name of the publisher is mentioned and this entry is closed by a comma. It is followed by the date of publication if the date is given on the title page. If the date appears in the copyright notice on the reverse side of the title page or elsewhere in the volume, the comma should be omitted and the date enclosed in square brackets [c 1978], [1978]. The entry is followed by a comma. Then follow the volume and page references and are separated by a comma if both are given. A period closes the complete documentary reference. But one should remember that the documentation regarding acknowledgements from magazine articles and periodical literature follow a different form as stated earlier while explaining the entries in the bibliography.

Certain English and Latin abbreviations are quite often used in bibliographies and footnotes to eliminate tedious repetition. The following is a partial list of the most common abbreviations frequently used in report-writing (the researcher should learn to recognise them as well as he should learn to use them):

anon., anonymous  
 ante., before  
 art., article  
 aug., augmented  
 bk., book  
 bull., bulletin  
 cf., compare  
 ch., chapter  
 col., column  
 diss., dissertation  
 ed., editor, edition, edited.  
 ed. cit., edition cited  
 e.g., *exempli gratia*: for example  
 eng., enlarged  
 et.al., and others  
 et seq., *et sequens*: and the following

ex., example

f., ff., and the following

fig(s)., figure(s)

fn., footnote

ibid., ibidem: in the same place (when two or more successive footnotes refer to the

same work, it is not necessary to repeat complete reference for the second footnote. Ibid. may be used. If different pages are referred to, pagination must be shown).

id., idem: the same

ill., illus., or

illust(s). illustrated, illustration(s)

Intro., intro., introduction

l, or ll, line(s)

loc. cit., in the place cited; used as op.cit., (when new reference

loco citato: is made to the same pagination as cited in the previous note)

MS., MSS., Manuscript or Manuscripts

N.B., nota bene: note well

n.d., no date

n.p., no place

no pub., no publisher

no(s)., number(s)

o.p., out of print

op. cit: in the work cited (If reference has been made to a work

opera citato and new reference is to be made, ibid., may be used, if intervening

reference has been made to different works, op.cit. must be used. The name of the author must precede.

p. or pp., page(s)

passim: here and there

post: after

rev., revised

tr., trans., translator, translated, translation

vid or vide: see, refer to

viz., namely

vol. or vol(s)., volume(s)

vs., versus: against

#### **4. Use of statistics, charts and graphs:**

A data need to be clarified with the contribution of the simplification or statistic techniques provided by the researcher. It can be a great result in the world of the report. In a human tendency the picture of something is well remember more than thousand words written about the concept. The presentation of statistics is usually in the form of tables, charts, bars and line-graphs and pictograms. This presentation is self-explanatory and complete in itself as it looks neat and attractive and good formatted.

#### **5. The final draft:**

After getting the data gathered at one place or material is gathered at one place and getting revise and rewrite the rough draft of the report is being the great care before writing the final draft. Here the researcher need to get some answer form the report that “Are the sentences written in the report clear? Are they grammatically correct? Do they say what is meant”? Do the various points incorporated in the report fit together logically? “here the researcher should glance or read the report just before the final revision as it is extremely helpful. Sentences that seem crystal-clear to the writer may prove quite confusing to other people; a connection that had seemed self-evident may strike others as a non-sequitur. A friendly critic, by pointing out passages that seem unclear or illogical, and perhaps suggesting ways of remedying the difficulties, can be an invaluable aid in achieving the goal of adequate communication.

#### **6. Bibliography:**

it is good to have a Bibliography appended to the research report at the end.

#### **7. Preparation of the index:**

At this stage the report is getting over, and an index provide the value of which lies in the fact that it acts as a good guide, to the reader. Index can be preparing both ways subject index and as author index. The format may consist the names of the subject-topics or concepts along with the number of pages on which they have appeared or discussed in the report, whereas the latter gives the similar information regarding the names of authors. The arrangement of index should be always alphabetically. Hence it is very easy to reader to prefer only one index common for names of authors, subject-topics, concepts and the like ones.

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### **7.6 PRECAUTIONS FOR WRITING RESEARCH REPORTS**

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Research report is the main factor of the research study because it is a channel of communicating the research findings to the readers. The main features of the good research report are the effectiveness and the efficient use hence if the report follow these two things then it is called as good research report. But when we do this we have to keep in mind some precautions.:

1. While finalizing the length of the report the researcher should keep in mind that it should be long enough to cover the subject but short enough to maintain interest. In fact, report-writing should not be a means to learning more and more about less and less.
2. A research good report is which sustains the reader's interest and does not make it bore or dull while reading the report.
3. Abstract terminology and technical jargon should be avoided in a research report. The words which are used in report should be easy and convey the matter as simply as possible. This, in other words, means that report should be written in an objective style in simple language.
4. Readers are often interested in acquiring a quick knowledge of the main findings and as such the report must provide a ready availability of the findings. For this purpose, charts, graphs and the statistical tables may be used for the various results in the main report in addition to the summary of important findings.
5. The layout of the report should be well thought out and must be appropriate and in accordance with the objective of the research problem.
6. The grammatical mistakes should not be there in the reports and it must be prepared strictly in accordance with the techniques of composition of report-writing such as the use of quotations, footnotes, documentation, proper punctuation and use of abbreviations in footnotes and the like.
7. The report must show the logical equivalence with the content or subject matter. It must reflect a structure wherein the different pieces of analysis relating to the research problem fit well.
8. Though the research report is a document it should show originality and should necessarily be an attempt to solve some intellectual problem. It must contribute to the society about the knowledge and it should use to solve some problem.
9. Towards the end, the report must also state the policy implications relating to the problem under consideration. It is usually considered desirable if the report makes a forecast of the probable future of the subject concerned and indicates the kinds of research still needs to be done in that particular field.
10. Appendices should be enlisted in respect of all the technical data in the report.
11. Bibliography of sources consulted is a must for a good report and must necessarily be given.
12. Index is also considered an essential part of a good report and as such must be prepared and appended at the end.

13. Report must be attractive in appearance, neat and clean, whether typed or printed.
14. Calculated confidence limits must be mentioned and the various constraints experienced in conducting the research study may also be stated in the report.
15. Objective of the study, the nature of the problem, the methods employed and the analysis techniques adopted must all be clearly stated in the beginning of the report in the form of introduction.

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## **7.7 SUMMARY**

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The main aim of this section is to facilitate researchers to write more efficient and more readable research reports. The reports can be of different type and it may be helpful to people who are in general good writers and also be cooperative to people who are experienced at writing this type of research report.

It also focuses on the problems that take place in the writing of a fastidious type of research report. Many people who inscribe reports of experimental research studies also write theoretical papers, methodological papers, spot papers, book reviews, or other types of piece of writing. Therefore, this concluding section is aimed to be a compendium of supportive instruction.

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## **7.8 UNIT END EXERCISE**

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1. How many types of reports are available?
2. Explain the precautions made for good research report writing.
3. Explain the mechanics for good research report writing
4. Write a note on formal and informal report
5. Write a note on footnote used in report writing.

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## **7.9 REFERENCES**

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- Dawson, Catherine, 2002, Practical Research Methods, New Delhi, UBS Publishers Distributors.
- Kothari, C.R.1985, Research Methodology-Methods and Techniques, New Delhi, Wiley Eastern Limited.
- Kumar Ranjit, 2005, Research Methodology-A Step-by-Step Guide for Beginners, (2nded), Singapore, Pearson Education

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