

STUDY MATERIAL

II MA, Economics

SEMESTER- III

RESEARCH METHODOLOGY (18PEC7)

Unit - I

Unit - I Social Research: Meaning – Definition – Objectives – Significance – Types of Research – Qualities of a Good Research – Deductive and Inductive Methods – Characteristics of Causality – Research Objectives in Social Research – Computer Application in Social Research.

What is Research?

Searching it again and again means Re-search. Research is defined as human activity based on intellectual application in the investigation of matter.

“Research is an organized and systematic way of finding answers to questions” Systematic because there is a definite set of procedures and steps which you will follow.

Research is a systematic inquiry to describe, explain, predict, and control the observed phenomenon.

Definition: The dictionary meaning of research is “a careful investigation or enquiry especially through search for new facts in any branch of knowledge”. Definition of Research Research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.

What is social research?

Social Research is a method used by social scientists and researchers to learn about people and societies so that they can design products/services that cater to various needs of the people. Different socio-economic groups belonging to different parts of a country think differently. Various aspects of human behavior need to be addressed to understand their thoughts and feedback about the social world, which can be done using Social Research. Any topic can trigger social research – new feature, new market trend or an upgrade in old technology.

Significance of Social Research

Source of Knowledge. அறிவின் ஆதாரம்

Social research is an important source of knowledge. It opens new ways of knowledge and wisdom. When something unknown brings to a researcher, there is a sort of inner pleasure and happiness. It gives knowledge to the researcher about the unknown facts. It paves out the way of ignorance and gives new direction in a social life.

Research in Informative. தகவலறிந்த ஆராய்ச்சி

It provides updated, proved, authentic and very useful information to the end users. Researchers and common people can take advantages from research. It is not only informative. Its findings are scientific based therefore the results and information are reliable.

Social Cohesion and Unity. சமூக ஒத்திசைவு மற்றும் ஒற்றுமை

Social unity in a problematic area b/w two groups or castes is only possible due to social research. Social research manifests the causes of these events and gives a remedial solution to it. So, social researcher is the main factor for bringing social coherence and unity in society.

Social Planning. If someone wants to develop and bring social growth and development in a society, social planning will be developed which is the outcome of social research. In this situation achieve the growth of society on right line is highly necessary. Social growth can possible only when problems are solved.

Solution of Social Problems. Social research also helps in the solution of social problems it is the research through which we can find the causative factors of an existing social problem and guide us about his solution.

Structural Changes. Social research is responsible for bringing structural changes in a social life. We bring social and cultural change in a social situation which is the outcome of social research.

Social Welfare. Social evils can be removed from society due to research. The process of social welfare is possible due to the procedure of social research through which social evils can be removed.

Social Prediction. Social research helps in making laws and the relation between social laws and their factors. It helps to know the existence of causative factors and their magnitude and this facilitates prediction of results.

Social Control. For smooth running of society social control is necessary. For this purpose we apply social research to a society for bringing social order and control.

Social Growth. The growth and development in a society is possible for the improvement of living standard and it is the main function of social research.

New Techniques. Social Research introduces new techniques and improves the old ones. It also modifies the existing tools of research. It gives us the methods of knowing new ways for using our research procedure.

What are the types of research?

Following are the types of research methods:

1. Basic research: A basic research definition is data collected to enhance knowledge. The main motivation is knowledge expansion. It is a non-commercial research that doesn't facilitate in creating or inventing anything. For example: an experiment to determine a simple fact.

2. Applied research: Applied research focuses on analyzing and solving real-life problems. This type refers to the study that helps solve practical problems using scientific methods. Studies play an important role in solving issues that impact the overall well-being of humans. For example: finding a specific cure for a disease.

3. Problem oriented research: As the name suggests, problem-oriented research is conducted to understand the exact nature of a problem to find out relevant solutions. The term "problem" refers to multiple choices or issues when analyzing a situation.

For example, revenue of a car company has decreased by 12% in the last year. The following could be the probable causes: there is no optimum production, poor quality of a product, no advertising, or economic conditions.

4. Problem solving research: This type of research is conducted by companies to understand and resolve their own problems. The problem-solving method uses applied research to find solutions to the existing problems.

5. Qualitative research: Qualitative research is a process that is about inquiry. It helps create in-depth understanding of problems or issues in their natural settings. This is a non-statistical method.

Qualitative research involves collecting and analyzing non-numerical data (e.g., text, video, or audio) to understand concepts, opinions, or experiences. It can be used to gather in-depth insights into a problem or generate new ideas for research.

These are some of the most common qualitative methods:

- **Observations:** recording what you have seen, heard, or encountered in detailed field notes.
- **Interviews:** personally asking people questions in one-on-one conversations.
- **Focus groups:** asking questions and generating discussion among a group of people.
- **Surveys:** distributing questionnaires with open-ended questions.
- **Secondary research:** collecting existing data in the form of texts, images, audio or video recordings, etc.

6. Quantitative research: Qualitative research is a structured way of collecting data and analyzing it to draw conclusions. Unlike qualitative methods, this method uses a computational and statistical process to collect and analyze data. Quantitative data is all about numbers.

Quantitative research involves a larger population — more people means more data. With more data to analyze, you can obtain more accurate results. This method uses close-ended questions because the researchers are typically looking to gather statistical data.

Qualities of Good Academic Research

Academic Research is defined as a process of collecting, analyzing and interpreting information to answer questions or solve a problem. But to qualify as good research, the process must have certain characteristics and properties: it must, as far as possible, be controlled, rigorous, systematic, valid and verifiable, empirical and critical. The main characteristics for good quality research is listed below:

1. *It is based on the work of others.*

2. *It is generalisable to other settings.*
3. *It is based on some logical rationale and tied to theory. In a way that it has the potential to suggest directions for future research.*
4. *It generates new questions or is cyclical in nature.*
5. *It is incremental.*
6. *It addresses directly or indirectly some real problem in the world.*
7. *It clearly states the variables or constructs to be examined.*
8. *Valid and verifiable such that whatever you conclude on the basis of your findings is correct and can be verified by you and others.*
9. *The researcher is sincerely interested and/or invested in this research.*

Deduction & Induction

In logic, we often refer to the two broad methods of reasoning as the *deductive* and *inductive* approaches.

Deductive reasoning works from the more general to the more specific.

Sometimes this is informally called a “top-down” approach.

We might begin with thinking up a *theory* about our topic of interest.

We then narrow that down into more specific *hypotheses* that we can test.

We narrow down even further when we collect *observations* to address the hypotheses.

This ultimately leads us to be able to test the hypotheses with specific data – a *confirmation* of our original theories.

Inductive reasoning works the other way, moving from specific observations to broader generalizations and theories.

Informally, we sometimes call this a “bottom up” approach (please note that it’s “bottom up” and *not* “bottoms up” which is the kind of thing the bartender says to customers when he’s trying to close for the night!).

In inductive reasoning, we begin with specific observations and measures, begin to detect patterns and regularities, formulate some tentative hypotheses that we can explore, and finally end up developing some general conclusions or theories.

These two methods of reasoning have a very different “feel” to them when you’re conducting research. Inductive reasoning, by its very nature, is more open-ended and exploratory, especially at the beginning. Deductive reasoning is more narrow in nature and is concerned with testing or confirming hypotheses. Even though a particular study may look like it’s purely deductive (e.g., an experiment designed to test the hypothesized effects of some treatment on some outcome), most social research involves both inductive and deductive reasoning processes at some time in the project. In fact, it doesn’t take a rocket scientist to see that we could assemble the two graphs above into a single circular one that continually cycles from theories down to observations and back up again to theories. Even in the most constrained experiment, the researchers may observe patterns in the data that lead them to develop new theories.

Deduction & Induction methods

The scope for two broad methods is generally examined in the study of economics as in other scientific enquiries.

Deductive method

One is the deductive or the abstract method

Deductive reasoning works from the more general to the more specific.

They start with a social theory that they find compelling and then test its implications with data.

That is, they move from a more general level to a more specific one. A deductive approach to research is the one that people typically associate with scientific investigation.

Outline the steps involved with an deductive approach to research.

Theorize/hypothesize-----analyse data-----hypothesis supported or not
General level focus-----analysis-----specific level of focus

Inductive method:

In an **inductive approach** to research, a researcher begins by collecting data that is relevant to her topic of interest.

Once a substantial amount of data have been collected, the researcher will then take a breather from data collection, stepping back to get a bird's eye view of their data.

At this stage, the researcher looks for patterns in the data, working to develop a theory that could explain those patterns. Thus, when researchers take an inductive approach, they start with a set of observations and then they move from those particular experiences to a more general set of propositions about those experiences. In other words, they move from data to theory, or from the specific to the general.

Outline the steps involved with an inductive approach to research.

Gathering Data-----look for patterns-----develop theory
Specific level of focus-----analyzing -----general level of focus

Causality assumes that the value of an interdependent variable is the reason for the value of a dependent variable. In other words, a person's value on Y is caused by that person's value on X , or X causes Y . Most social scientific research is interested in testing causal claims. In fact, most theoretically derived hypotheses implicitly (or explicitly) assume

causal relationships. However, causality is very difficult to prove. In fact, some believe that causality can never be demonstrated with finality and that the best researchers can do is to generate increasingly compelling evidence that is consistent with causality.

Causal research, also called **explanatory research**, is the investigation of cause-and-effect relationships. To determine causality, it is important to observe variation in the variable assumed to cause the change in the other variable(s), and then measure the changes in the other variable(s). Other confounding influences must be controlled for so they don't distort the results, either by holding them constant in the experimental creation of data, or by using statistical methods. This type of research is very complex and the researcher can never be completely certain that there are no other factors influencing the causal relationship, especially when dealing with people's attitudes and motivations. There are often much deeper psychological considerations that even the respondent may not be aware of.

Computer Application in Social Research.

WHY COMPUTERS?

The importance of computers in scientific research is remarkably high and the use of a computer can help scientific research hugely, and is an almost invaluable tool.

There are many reasons why computers are so important in scientific research and here are some of the main reasons:

SPEED: computer can process numbers and information in a very short time. So researcher can process and analyze data quickly. By saving time researcher can conduct further research.

ACCURACY: Computer is incredibly accurate. Accuracy is very much important in scientific research. Wrong calculation could result an entire research or project being filled with incorrect information.

ORGANIZATION: We can store millions of pages of information by using simple folders, word processors & computer programs. Computer is more productive & safer than using a paper filing system in which anything can be easily misplaced.

CONSISTENCY: computer cannot make mistakes through “tiredness” or lack of concentration like human being. This characteristic makes it exceptionally important in scientific research.

COMPUTER IN THE RESEARCH PROCESS

Research process consists of series of actions or steps necessary to effectively carry out research and the desired sequencing of these steps. The following order concerning various steps provides a useful procedural guideline regarding the research process:

- (1) formulating the research problem;
- (2) extensive literature survey;
- (3) developing the hypothesis;
- (4) preparing the research design;
- (5) determining sample design;
- (6) collecting the data;
- (7) execution of the project;
- (8) analysis of data;
- (9) hypothesis testing;
- (10) generalisations and interpretation, and

(11) preparation of the report or presentation of the results, i.e., formal write-up of conclusions reached.

There are five major phases of the research process.

They are:

1. Conceptual phase
2. Design and planning phase
3. Data collection phase
4. Data Analysis phase and
5. Research Publication phase

1. Role of Computer in Conceptual Phase The conceptual phase consists of formulation of research problem, extensive literature survey, theoretical frame work and developing the hypothesis.

Use of computers in extensive literature review: computers help for searching the literatures (for review of literature) and bibliographic reference stored in the electronic database of the world wide webs. It can thus be used for storing relevant published articles to the retrieved whenever needed. This has the advantage over searching the

literatures in the form of books, journals and other newsletters at the libraries which consume considerable amount of time and effort.

2. Role of Computers in Design and Planning Phase This phase consists of research design preparation and determining sample design. Design and planning phase also consists of population, research variables, sampling plan, reviewing research plan and pilot study.

Role of Computers for Sample Size Calculation: Several software's are available to calculate the sample size required for a proposed study. The standard deviation of the data from the pilot study is required for the sample size calculation.

3. Role of Computers in Data collection phase This Empirical phase consists of collecting and preparing the data for analysis: In research studies, the preparation and inputting data is the most labor-intensive and time consuming aspect of the work. Typically the data will be initially recorded on a questionnaire or record for suitable for its acceptance by the computer. To do this the researcher in conjunction with the statistician and the programmer, will convert the data into Microsoft word file or excel spreadsheet or any statistical software data file. These data can be directly opened with statistical software's for analysis.

Data collection and Storage: The data obtained from the subjects are stored in computers are word files or excel spread sheets or any statistical software data file. This has the

advantage of making necessary corrections or editing the whole layout of the tables if needed, which is impossible or time consuming in case of writing in papers. Thus, computers help in data entry, data editing, data management including follow up actions etc. computers also allow for greater flexibility in recording the data while they are collected as well as greater ease during the analysis of these data. Examples of editors are WordPad, SPSS data editor, word processors, others like ultraedit etc.

Data exposition: Most researchers are anxious about seeing the data: what they look like; how they are distributed etc. you can also examine different dimension of variables or plot them in various charts using a statistical application.

4. Role of Computers in Data Analysis This phase consist of the analysis of data, hypothesis testing and generalisations and interpretation. Data analysis phase mainly consist of statistical analysis of the data and interpretation of results.

Data analysis: many software's are now available to perform the mathematical part of the research process i.e. the calculations using various statistical methods.

Softwares like SPSS and spreadsheets are the widely used. They can be like calculating the sample size for a proposed study, hypothesis testing and calculating the power of the study. Familiarity with any one package will suffice to carry out the most intricate statistical analysis.

Computers are useful not only for statistical analysis, but also to monitor the accuracy and completeness of the data as they are collected. These software's also display the results in graphical chart or graph form.

5. Role of Computer in Research Publication This phase consists of preparation of the report or presentation of the results, i.e., formal write-up of conclusions reached. This is the research publication phase. The research article, research paper, research thesis or research dissertation is typed in word processing software and converted to portable data format (PDF) and stored and/or published in the world wide web. Online sites are available through we can convert our word file into any format like html, pdf etc. Various online applications are also available for this purpose. Even we can prepare our document using online word processing software and can store/edit/access it from anywhere using internet.

ROLE OF COMPUTERS IN SCIENTIFIC RESEARCH There are various computer applications used in scientific research. Some of the most important applications used in scientific research are data storage, data analysis, and knowledge sharing.

Data Storage Experimentation is the basis of scientific research. Every experiment in any of the natural sciences generates a lot of data that needs to be stored and analyzed to derive important conclusions, to validate or disprove hypotheses. Computers attached with experimental apparatuses, directly record data as it's generated and subject it to

analysis through specially designed software. Data storage is possible in SPSS data file, lotus spreadsheet, excel spreadsheet, ASCII/DOS text file etc.

Data Analysis Analyzing tons of statistical data is made possible using specially designed algorithms that are implemented by computers. This makes the extremely time-consuming job of data analysis to be a matter of a few minutes. In genetic engineering, computers have made the sequencing of the entire human genome possible. Data from different sources can be stored and accessed via computer networks set up in research labs, which makes collaboration simpler.

Knowledge Sharing Through Internet Lastly, in the form of Internet, computers have provided an entirely new way to share knowledge. Today, anyone can access the latest research papers that are made available for free on websites. Sharing of knowledge and collaboration through the Internet, has made international cooperation on scientific projects possible.

Through various kinds of analytical software programs, computers are contributing to scientific research in every discipline, ranging from biology to astrophysics, discovering new patterns and providing novel insights. When the work in neural network based artificial intelligence advances and computers are granted with the ability to learn and think for themselves, future advances in technology and research will be even more rapid.

Unit - II

Unit - II Research Problem and Design: Formulation of Research Problem – Sources of Research Problem – Meaning of Research Design – Definition – Concepts - Need for Research Design – Steps in Research Design.

Formulation of Research Problem:

After defining it, you can start writing your report. It means that research problems or questions are the fuel driving the entire scientific process and they serve as the foundation of any experimental design or method, from case studies to real experiments.

Why does it matter to researchers? It's an important problem that you state in your research paper to define your specific study area and provide a brief synopsis of how you develop a hypothesis. The quality of a research problem defines your success.

What is a research problem?

It's a clear and definite statement or expression about your chosen area of concern, a difficulty to eliminate, a condition to improve, or a troubling problem that exists in theory, literature, and practice. A research problem indicates a need for its meaningful investigation. It doesn't state how to do something and a researcher shouldn't present a value question or offer a broad research proposal.

*A **research problem** is a statement about an area of concern, a condition to be improved, a difficulty to be eliminated, or a troubling question that exists in scholarly literature, in theory, or in practice that points to the need for meaningful understanding and deliberate investigation. In some social science disciplines the research problem is typically posed in the form of a question. A research problem **does not** state how to do something, offer a vague or broad proposition, or present a value question.*

The purpose of a problem statement is to:

- 1. Introduce the reader to the importance of the topic being studied. The reader is oriented to the significance of the study and the research questions or hypotheses to follow.***
- 2. Places the problem into a particular context that defines the parameters of what is to be investigated.***

- 3. Provides the framework for reporting the results and indicates what is probably necessary to conduct the study and explain how the findings will present this information.*

How to identify a research problem?

After choosing a specific topic for your academic paper, you need to state it as a clear research problem that identifies all the issues that you'll address. It's not always simple for students to formulate it. In some fields, they may end up spending a lot of time thinking, exploring, and studying before getting a clear idea of what research questions to answer.

Some topics are too broad to give a researchable issue. For example, if you decide to study certain social issues, like child poverty, remember that they don't provide any researchable question. These are very broad to address and take a lot of time and resources to become unfeasible so that your study will lack enough focus and depth.

What is a statement of a research problem?

An adequate statement of your research problem plays an important role in the success of your academic paper and study. It's possible to generate a number of researchable issues from the same subject because there are many issues that may arise out of it. Your study should pursue only one in detail.

Basic characteristics of research problem

For your research problem to be effective, make sure that it has these basic characteristics:

- Reflecting on important issues or needs;
- Basing on factual evidence (it's non-hypothetical);
- Being manageable and relevant;
- Suggesting a testable and meaningful hypothesis (avoiding useless answers).

Formulating your research problem

Formulating your research problem enables you to make a purpose of your study clear to yourself and target readers. Focus your paper on providing relevant data to address it. A problem statement is an effective and essential tool to keep you on track with research and evaluate it. How can you formulate a powerful research problem? Consider 5 ways to formulate the research problem:

- Specify your research objectives;

- Review its context or environment;
- Explore its nature;
- Determine variable relationships;
- Anticipate the possible consequences of alternative approaches.

Specific research objectives

A clear statement that defines all objectives can help you conduct and develop effective and meaningful research. They should be manageable to bring you success. A few goals will help you keep your study relevant. This statement also helps professors evaluate the questions your research project answers and different methods that you use to address them.

Review the context of your research problem

It's necessary to work hard to define and test all kinds of environmental variables to make your project successful. Why do you need to do that? This step can help you define if the important findings of your study will deliver enough data to be worth considering. Identify specific environmental variables that may potentially affect your research and start formulating effective methods to control all of them.

Why explore the nature of your research problem?

Research problems may range from simple to complex, and everything depends on a range of variables and their relationships. Some of them can be directly relevant to specific research questions, while others are completely unimportant for your project.

Why should you understand their nature? This knowledge enables you to develop effective solutions. To get a deep understanding of all dimensions, think about focus groups and other relevant details to provide the necessary insight into a particular question.

Determine variable relationships

Scientific, social, and other studies often focus on creating a certain sequence of repeating behaviors over time. What does your project entail? Completing the entire process involves:

- Identifying the variables that affect possible solutions to your research problem;
- Deciding on the degree to which you can use and control all of them for study purposes;
- Determining functional relationships between existing variables;
- Choose the most critical variables for a solution of your research problem.

During the formulation stage, it's necessary to consider and generate as many potential approaches and variable relationships as you can.

Source of Research Problem

The first step of the social work research is to identify the problem for the research. The identification of the problem is not a easy task of the research. It is the stimulation that make the research to react for the systematic investigation. In social work research following are the major source of the research problems:

- **Experience**

The experience of the social work realizes the problems that can be researchable. The challenges face by the social worker in field, office, and other place may be the source of research problem. The problem may be people, place or other.

- **Observation:**

The social worker observes the behaviour of people at work or in the field or in another place where they visit. These may be the problem where social carried out the research. The behaviour of the peoples, situation of field, attitude of people, etc. can be observe by the social worker which can be observe by systematic or unsystematic way.

- **Theory**

Theory is the set of assumption about the causes of behaviour and roles that focus on the establishing the relation between dependent and independent variable. The application of the theory is dependent on the assumption which can be source of the problem of the researcher. Beside that the test of the theory in field and modification is also the source of the problem of the social work research.

- **Social problem:**

The social problem itself is the source of problems for the social work research. The social issues, social trend, social change, etc. are the source of problem in social work research.

- **Knowledge Gap (Literature Review):**

The little understanding about certain issues, problem, people, place, etc. may be the problem that are researchable are the source of the social work research problem. While reviewing the literature if the researcher found that the existing

understanding is not sufficient to solve the problem of client than it may be the source of research problem.

- **Contradictory Results:**

Some of the facts or theory have some degree of contradiction and in order to clarify these issues the research may be conducted. Thus, these contradictions are the source of the research problem for the social worker.

RESEARCH DESIGN

Meaning: Research design is the framework of research methods and techniques chosen by a researcher. The design allows researchers to hone in on research methods that are suitable for the subject matter and set up their studies up for success.

VARIOUS IMPORTANT CONCEPTS OF RESEARCH DESIGN

1) Dependent and independent variables: A *variable* is a concept that can take on different quantitative values. E.g., weight, height, income, etc. A *dependent variable* can be defined as the variable, which depends upon or is a consequence of the other variable. On the other hand, an *independent variable* can be defined as the variable that is antecedent to the dependent variable. E.g., if height depends upon age, then height is a dependent variable, while age is an independent variable.

2) Extraneous variable: Although, the independent variables are unrelated to the study purpose, they might however affect the dependent variables, known as *extraneous variables*. E.g., When a researcher investigates the hypothesis of the relationship between children's gains in moral studies achievement and their self-concepts. The self-concept denotes an independent variable, whereas the moral studies achievement denotes a dependent variable. However, intelligence may also affect the moral studies achievement, but as it is unrelated to the study purpose, it will thus be called an extraneous variable.

3) Control: The most significant quality of a good research design is to reduce the influence/effect of extraneous variables. *Control* is a technical term, which is used while designing the study, by reducing the effects of extraneous independent variables. Besides, in experimental studies, the term control refers to the restraining of experimental conditions.

4) Confounded relationship: In case the dependent variable is bound by the influence of extraneous variable, the relationship between the dependent and independent variables is known to be confused by extraneous variables.

5) Research hypothesis: This can be defined as the prediction or a hypothesised relationship that needs to be tested by scientific methods. Besides, it is a predictive statement, which connects an independent variable to a dependent variable. Moreover, a

research hypothesis needs to contain, at least, one independent and one dependent variable.

6) Experimental and non-experimental hypothesis-testing research: When a research aims at investigating a research hypothesis, it is known as the *hypothesis-testing research*. However, it can be of the experimental or the non-experimental design. On the other hand, a research in which the independent variable is manipulated is known as the *experimental hypothesis-testing research*, while the research in which an independent variable is not manipulated is known as the *non-experimental hypothesis-testing research*.

7) Experimental and control groups: When any group is exposed to the usual conditions of an experimental hypothesis-testing research, it is known as a *control group*. Whereas, when the group is exposed to some other special condition, it is known as an *experimental group*.

8) Treatments: This can be defined as the different types of conditions under which the experimental and control groups are put. E.g., In order to determine the comparative impact of three varieties of fertilizers on a crop yield, the three different varieties of fertilizers will be treated as three different treatments.

9) Experiment: This can be defined as the process of examining the truth of a statistical hypothesis, relating to some research problem. E.g., An experiment conducted in order to research the usefulness of a newly developed medicine.

Moreover, experiments can be of two types:

i. *Absolute experiment* The determination of the impact of a fertilizer on a crop yield is an example of absolute experiment.

ii. *Comparative experiment* The determination of the impact of one fertilizer, in comparison to another fertilizer, is an example of comparative experiment.

10) Experimental units: These represent the pre-determined plots or blocks, where different types of treatments are used. Moreover, such type of experimental units must be selected, as well as defined, very cautiously and thoroughly.

NEED FOR RESEARCH DESIGN

- It reduces inaccuracy;
- Helps to get maximum efficiency and reliability;
- Eliminates bias and marginal errors;
- Minimizes wastage of time;
- Helpful for collecting research materials;
- Helpful for testing of hypothesis;
- Gives an idea regarding the type of resources required in terms of money, manpower, time, and efforts;
- Provides an overview to other experts;
- Guides the research in the right direction.

Steps of Research Design

1) Formulation of the research problem

Necessity is the mother of all inventions, and accordingly, it is a problem which necessitates research. A general area of interest is selected by the researcher initially to indicate the problem.

The problem is evaluated by the program, which helps to shed new light on the facts and collecting of useful fact to plan social or even policy-making purposes. Social scientists involved their values as well as the social conditions which are prevalent in order to select the problem for the research.

2) Literature review

The research is based on past knowledge, and the researcher should always make sure to take advantage of the work, which is already available or preserved earlier.

This not only helps the investigator to avoid replicating the hypothesis of earlier research but also enables him and provides evidence that he knows the current research which has already been done and can work on the untested and unknown field.

3) Formation of Hypothesis in Research Design

The next step in the research is to formulate a hypothesis which will be tentative with nature and which would explain the nature of the problem. This explanation is tentative in nature refers to the statement of relation and relates two or more variables.

4) Formulating a Research Design

Once the problem has been defined, and the literature review is completed after formulating of the hypothesis, the researcher then starts to work on the design of the research. The design of research must be a blueprint for the general collection.

5) Defining the nature of the study

The nature of the study as the cause of the individual items which are under consideration in the field of study. Nature refers to the sum of units for individuals from which a sample is another part in order to find out results, and that analysis is applied to it.

6) Sample design

It is not possible under different circumstances to enumerate all of the atoms included in the universe because it requires the result of resources like Mani time and energy which is why the researcher decides to select a representative from the population known as a sample and the process is known as simple design.

7) Administration of the tools of Data collection in Research Design

Appropriate data is required for any research work. Along with appropriateness, the data should also be adequate. Considering the financial and time and other resources which are available, the data may differ considerably.

8) Data analysis

After the collection of data is completed the investigator then has to analyze the collected data which involves operations like segregating the data into different categories and application of coding for deposition to the raw data that is collected.

Statistical conclusions were drawn after that. These operations are supervised very closely, and at the beginning, it is the researchers who have to classify some of the raw data into different categories based on similar purposes.

9) Hypothesis testing in Research Design

The studies do not always confirm the original hypothesis, and in many cases, the hypothesis may be refused, and the researcher in such cases mastery for a visit there results and conclusions. It is not possible in case of behavioral sciences to test multiple hypotheses.

10) Interpretation and generalization

After the test of hypothesis is completed in Research Design, and the validity is confirmed, the researcher has reached a stage of generalization, which is generally seen as a real value to the research.

11) Preparing the report of the Research

The final product of all the research activity is the report which gives a written account of the entire journey along with the path to find new knowledge. This type requires a technical task, which is why writing research is not only but also tests patients and efforts on the part of the researcher.

Unit - III

Unit - III Sampling Techniques and Test of Hypothesis: Meaning of Sampling – Essential of Good Sampling – Methods of Sampling – Random and Non-Random Sampling – Simple Random Sampling – Systematic Sampling – Convenience Sampling – Quota Sampling - Meaning of Hypothesis – Formulation of Hypothesis – Types of Hypothesis – Null and Alternative Hypothesis - Testing of Hypothesis.

What Is Sampling?

Sampling is a process used in statistical analysis in which a predetermined number of observations are taken from a larger population. The methodology used to sample from a larger population depends on the type of analysis being performed, but it may include simple random sampling or systematic sampling.

What are the Essentials of good Sampling?

1. Representative:

The sample should truly represent the characteristics of the verse. For this investigator should be free from bias and the method of collection should be appropriate.

2. Adequacy:

The size of the sample should be adequate i.e., neither too large nor small but commensurate with the size of the population.

3. Homogeneity:

There should be homogeneity in the nature of all the units selected for the sample. If the units of the sample are of heterogeneous character it will impossible to make a comparative study with them.

4. Independent ability:

The method of selection of the sample should be such that the items of the sample are selected in an independent manner. This means that selection of one item should not influence the selection of another item in any manner and that each item should be selected on the basis of its own merit.

Probability sampling methods

Probability sampling means that every member of the population has a chance of being selected. It is mainly used in quantitative research. If you want to produce results that are representative of the whole population, you need to use a probability sampling technique.

There are four main types of probability sample.

1. Simple random sampling

In a simple random sample, every member of the population has an equal chance of being selected. Your sampling frame should include the whole population.

To conduct this type of sampling, you can use tools like random number generators or other techniques that are based entirely on chance.

Example

You want to select a simple random sample of 100 employees of Company X. You assign a number to every employee in the company database from 1 to 1000, and use a random number generator to select 100 numbers.

2. Systematic sampling

Systematic sampling is similar to simple random sampling, but it is usually slightly easier to conduct. Every member of the population is listed with a number, but instead of randomly generating numbers, individuals are chosen at regular intervals.

Example

All employees of the company are listed in alphabetical order. From the first 10 numbers, you randomly select a starting point: number 6. From number 6 onwards, every 10th person on the list is selected (6, 16, 26, 36, and so on), and you end up with a sample of 100 people.

If you use this technique, it is important to make sure that there is no hidden pattern in the list that might skew the sample. For example, if the HR database groups employees by team, and team members are listed in order of seniority, there is a risk that your interval

might skip over people in junior roles, resulting in a sample that is skewed towards senior employees.

3. Stratified sampling

Stratified sampling involves dividing the population into subpopulations that may differ in important ways. It allows you draw more precise conclusions by ensuring that every subgroup is properly represented in the sample.

To use this sampling method, you divide the population into subgroups (called strata) based on the relevant characteristic (e.g. gender, age range, income bracket, job role).

Based on the overall proportions of the population, you calculate how many people should be sampled from each subgroup. Then you use random or systematic sampling to select a sample from each subgroup.

Example

The company has 800 female employees and 200 male employees. You want to ensure that the sample reflects the gender balance of the company, so you sort the population into two strata based on gender. Then you use random sampling on each group, selecting 80 women and 20 men, which gives you a representative sample of 100 people.

4. Cluster sampling

Cluster sampling also involves dividing the population into subgroups, but each subgroup should have similar characteristics to the whole sample. Instead of sampling individuals from each subgroup, you randomly select entire subgroups.

If it is practically possible, you might include every individual from each sampled cluster. If the clusters themselves are large, you can also sample individuals from within each cluster using one of the techniques above.

This method is good for dealing with large and dispersed populations, but there is more risk of error in the sample, as there could be substantial differences between clusters. It's difficult to guarantee that the sampled clusters are really representative of the whole population.

Example

The company has offices in 10 cities across the country (all with roughly the same number of employees in similar roles). You don't have the capacity to travel to every office to collect your data, so you use random sampling to select 3 offices – these are your clusters.

Non-probability sampling methods

In a non-probability sample, individuals are selected based on non-random criteria, and not every individual has a chance of being included.

This type of sample is easier and cheaper to access, but it has a higher risk of sampling bias, and you can't use it to make valid statistical inferences about the whole population.

Non-probability sampling techniques are often appropriate for exploratory and qualitative research. In these types of research, the aim is not to test a hypothesis about a broad population, but to develop an initial understanding of a small or under-researched population.

1. Convenience sampling

A convenience sample simply includes the individuals who happen to be most accessible to the researcher.

This is an easy and inexpensive way to gather initial data, but there is no way to tell if the sample is representative of the population, so it can't produce generalizable results.

Example

You are researching opinions about student support services in your university, so after each of your classes, you ask your fellow students to complete a survey on the topic. This is a convenient way to gather data, but as you only surveyed students taking the same classes as you at the same level, the sample is not representative of all the students at your university.

2. Voluntary response sampling

Similar to a convenience sample, a voluntary response sample is mainly based on ease of access. Instead of the researcher choosing participants and directly contacting them, people volunteer themselves (e.g. by responding to a public online survey).

Voluntary response samples are always at least somewhat biased, as some people will inherently be more likely to volunteer than others.

Example

You send out the survey to all students at your university and a lot of students decide to complete it. This can certainly give you some insight into the topic, but the people who responded are more likely to be those who have strong opinions about the student support services, so you can't be sure that their opinions are representative of all students.

3. Purposive sampling

This type of sampling involves the researcher using their judgement to select a sample that is most useful to the purposes of the research.

It is often used in qualitative research, where the researcher wants to gain detailed knowledge about a specific phenomenon rather than make statistical inferences. An effective purposive sample must have clear criteria and rationale for inclusion.

Example

You want to know more about the opinions and experiences of disabled students at your university, so you purposefully select a number of students with different support needs in order to gather a varied range of data on their experiences with student services.

4. Snowball sampling

If the population is hard to access, snowball sampling can be used to recruit participants via other participants. The number of people you have access to “snowballs” as you get in contact with more people.

Example

You are researching experiences of homelessness in your city. Since there is no list of all homeless people in the city, probability sampling isn't possible. You meet one person who agrees to participate in the research, and she puts you in contact with other homeless people that she knows in the area.

MEANING OF HYPOTHESIS: Hypothesis literally means an idea or theory that the researcher sets as the goal of the study and examines it and is replaced as a theory when the hypothesis is true in the study's conclusion.

FORMULATION OF HYPOTHESIS

- Thus, hypothesis is a statement which should be a clear, specific, testable and predictable statement.
- Hypothesis must be guided by some available information or evidence.
- The hypothesis may also has theoretical guidance.
- It can be formulated in various research designs.
- Hypothesis, therefore, requires a research question, first a research question then.

- Collection and study of available informations/ knowledge related to research question then.
- Go for testing or verifying preconceived ideas, for it research tools will be decided according to research question.
- Research question can be answered by both qualitative and quantitative research methodologies but hypothesis is mostly used for quantitative research methods approach.
- Hypothesis demonstrate that researcher has prior knowledge about research study.
- Therefore, hypothesis provides direction for data collection and their interpretation.

Types of Research Hypotheses

Null Hypothesis

The null hypothesis states that there is no relationship between the two variables being studied (one variable does not affect the other).

It states results are due to chance and are not significant in terms of supporting the idea being investigated.

Null hypothesis symbol

- The symbol for the null hypothesis is H_0 , and it is read as H-null, H-zero, or H-naught.
- The null hypothesis is usually associated with just 'equals to' sign as a null hypothesis can either be accepted or rejected.

Null hypothesis purpose

- The main purpose of a null hypothesis is to verify/ disprove the proposed statistical assumptions.
- Some scientific null hypothesis help to advance a theory.
- The null hypothesis is also used to verify the consistent results of multiple experiments. For e.g., the null hypothesis stating that there is no relation between some medication and age of the patients supports the general effectiveness conclusion, and allows recommendations.

Alternative Hypothesis

The alternative hypothesis states that there is a relationship between the two variables being studied (one variable has an effect on the other).

It states that the results are not due to chance and that they are significant in terms of supporting the theory being investigated.

Alternative hypothesis symbol

- The symbol of the alternative hypothesis is either H_1 or H_a while using less than, greater than or not equal signs.

Alternative hypothesis purpose

- An alternative hypothesis provides the researchers with some specific restatements and clarifications of the research problem.
- An alternative hypothesis provides a direction to the study, which then can be utilized by the researcher to obtain the desired results.
- Since the alternative hypothesis is selected before conducting the study, it allows the test to prove that the study is supported by evidence, separating it from the researchers' desires and values.
- An alternative hypothesis provides a chance of discovering new theories that can disprove an existing one that might not be supported by evidence.

What Is Hypothesis Testing?

Hypothesis testing is an act in statistics whereby an analyst tests an assumption regarding a population parameter. The methodology employed by the analyst depends on the nature of the data used and the reason for the analysis.

Four Steps of Hypothesis Testing

All hypotheses are tested using a four-step process:

1. The first step is for the analyst to state the two hypotheses so that only one can be right.
2. The next step is to formulate an analysis plan, which outlines how the data will be evaluated.
3. The third step is to carry out the plan and physically analyze the sample data.
4. The fourth and final step is to analyze the results and either reject the null hypothesis, or state that the null hypothesis is plausible, given the data.

The testing process

In the statistics literature, statistical hypothesis testing plays a fundamental role.^[4] There are two mathematically equivalent processes that can be used.^[5]

The usual line of reasoning is as follows:

1. There is an initial research hypothesis of which the truth is unknown.

2. The first step is to state the relevant **null** and **alternative hypotheses**. This is important, as mis-stating the hypotheses will muddy the rest of the process.
3. The second step is to consider the statistical assumptions being made about the sample in doing the test; for example, assumptions about the statistical independence or about the form of the distributions of the observations. This is equally important as invalid assumptions will mean that the results of the test are invalid.
4. Decide which test is appropriate, and state the relevant **test statistic** T .
5. Derive the distribution of the test statistic under the null hypothesis from the assumptions. In standard cases this will be a well-known result. For example, the test statistic might follow a Student's t distribution with known degrees of freedom, or a normal distribution with known mean and variance. If the distribution of the test statistic is completely fixed by the null hypothesis we call the hypothesis simple, otherwise it is called composite.
6. Select a significance level (α), a probability threshold below which the null hypothesis will be rejected. Common values are 5% and 1%.
7. The distribution of the test statistic under the null hypothesis partitions the possible values of T into those for which the null hypothesis is rejected -- the so-called *critical region* -- and those for which it is not. The probability of the critical region is α . In the case of a composite null hypothesis, the maximal probability of the critical region is α .
8. Compute from the observations the observed value t_{obs} of the test statistic T .
9. Decide to either reject the null hypothesis in favor of the alternative or not reject it. The decision rule is to reject the null hypothesis H_0 if the observed value t_{obs} is in the critical region, and to accept or "fail to reject" the hypothesis otherwise.

A common alternative formulation of this process goes as follows:

1. Compute from the observations the observed value t_{obs} of the test statistic T .
2. Calculate the p -value. This is the probability, under the null hypothesis, of sampling a test statistic at least as extreme as that which was observed (the maximal probability of that event, if the hypothesis is composite).
3. Reject the null hypothesis, in favor of the alternative hypothesis, if and only if the p -value is less than (or equal to) the significance level (the selected probability) threshold ().

Unit - IV

Unit - IV Collection and Analysis of Data: Sources of Data – Primary and Secondary Data – Method of Collecting Primary and Secondary Data Observation and Experiment – Survey – Scaling Techniques - Analysis of Data – Interpretation of Data.

Sources of Data

Sources of Data can be classified into two types. Statistical sources refer to data that are gathered for some official purposes and incorporate censuses and officially administered surveys. Non-statistical sources refer to the collection of data for other administrative purposes or for the private sector.

What are the different sources of data?

Following are the two sources of data:

1. Internal Source

- When data are collected from reports and records of the organization itself, it is known as the internal source.
- For example, a company publishes its 'Annual Report' on Profit and Loss, Total Sales, Loans, Wages etc.

2. External Source

- When data are collected from outside the organization, it is known as the external source.
- For example, if a Tour and Travels Company obtains information on 'Tamilnadu Tourism' from TN Transport Corporation, it would be known as external sources of data.

Types of Data

A) Primary Data

- Primary data means 'First-hand information' collected by an investigator.
- It is collected for the first time.
- It is original and more reliable.
- For example Population census conducted by the government of India after every 10 years.

B) Secondary Data

- Secondary data refers to ‘Second-hand information’.
- These are not originally collected rather obtained from already published or unpublished sources.
- For example the Address of a person taken from the Telephone Directory or Phone number of a company taken from ‘Just Dial’.

Methods of Collecting Primary Data

1. Direct Personal Investigation
2. Indirect Oral Investigation
3. Information Through Correspondents
4. Telephonic Interview
5. Mailed Questionnaire
6. The questionnaire filled by enumerators

Give The Meaning Of The Following Terms:

(A) Investigator

(B) Enumerator

(C) Informant/respondent

Answer:

Investigator	<ul style="list-style-type: none"> • One who conducts the investigation i.e. statistical enquiry and seeks information is known as Investigator. • It can be an individual person or an organization.
Enumerators	<ul style="list-style-type: none"> • Enumerators are the persons who help the Investigators in the collection of data.
Informant	<ul style="list-style-type: none"> • Informants are the respondents who supply the information to the investigator or enumerators.

1. Direct Personal Investigation

(A) Direct Personal Investigation	<ul style="list-style-type: none"> • Under this method, the Investigator obtains the first-hand information from the respondents themselves. • He personally visits the respondents to collect information (data).
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Merits Of Direct Personal Investigation:	
(1) Reliable And Accurate	<ul style="list-style-type: none"> Data collected are first hand and original in nature. So, these are more reliable and accurate.
(2) Flexibility	<ul style="list-style-type: none"> In this method, questions can be modified according to the level of the respondent or other situations.
(3) Additional Information	<ul style="list-style-type: none"> Some additional information may also be collected along with the required information. This additional information can be used in future investigation.
demerits of direct personal investigation:	
(1) Not Suitable For Wide Area	<ul style="list-style-type: none"> It is not suitable when the area of coverage is considerably wide.
(2) Time-consuming	<ul style="list-style-type: none"> This method is time-consuming as investigator personally visits the various places and meet different people to collect information.
(3) Expensive	<ul style="list-style-type: none"> This method is expensive particularly when the field of investigation is large.
(4) Personal Bias	<ul style="list-style-type: none"> Data collected in this method is subject to personal bias.

2. Indirect Oral Investigation

(A) Indirect Oral Investigation	Under this method, instead of directly approaching the informants, the investigators interviewed several other persons who are directly or indirectly in touch with the informants.
Merits Of Indirect Oral Investigation:	
(1) Wide Coverage	<ul style="list-style-type: none"> A wide area can be brought under investigation through this method.

(2) Economical	<ul style="list-style-type: none"> It is economical in terms of time, money and manpower.
demerits of indirect oral investigation:	
(1) Indirect Information	<ul style="list-style-type: none"> Since the information is not collected directly from the party, it is doubtful that it will be fully true.
(2) Lack Of Accuracy	<ul style="list-style-type: none"> As compared to Direct Personal Investigation, the degree of accuracy of the data is likely to be lower.
(3) Lack Of Uniformity	<ul style="list-style-type: none"> Information collected from different persons for the same party may not be homogeneous and comparable.
(4) Possibility Of Biased Information	<ul style="list-style-type: none"> Respondent\witness can modify the information according to his personal interest.
<ul style="list-style-type: none"> 	

3. Information through Correspondents

information through correspondents method' of collecting Primary data. Give its merit and demerits.

Answer:

(A) Information Through Correspondents	Under this method, local agents or correspondents are appointed and trained to collect the information from the respondents.
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(b) Following are the merits of information through correspondents:

(1) Wide Coverage	<ul style="list-style-type: none"> This method is useful where the field of investigation is very wide and the information is to be collected from different parts of the country.
(2) Economical	<ul style="list-style-type: none"> This method is quite economical and time-saving.
(3) Suitable For Special Purposes	<ul style="list-style-type: none"> This method is suitable for some special purpose investigations.
(4) CONTINUITY	<ul style="list-style-type: none"> It is very useful for collecting information on a regular

	basis.
demerits of information through correspondents:	
(1) Lack Of Uniformity	<ul style="list-style-type: none"> The information supplied by different correspondents often lacks homogeneity, and hence, not comparable.
(2) Lack Of Reliability	<ul style="list-style-type: none"> Data obtained using this method may not be very reliable because of the possibility of personal bias and prejudice of the enumerator.
(3) Less Accuracy	<ul style="list-style-type: none"> This method cannot be used where a high degree of accuracy is required.
(4) Costly	<ul style="list-style-type: none"> A lot of time & money is spent to collect the information through correspondence.

4.Telephonic Interviews

(A) Telephonic Interviews	Under this method, data are collected through an interview over the telephone.
merits of telephonic interviews:	
(1) Wide Coverage	<ul style="list-style-type: none"> This method is useful where the field of investigation is very wide and the information is to be collected from different parts of the country.
(2) Economical	<ul style="list-style-type: none"> This method is quite economical and time-saving.
(3) Reliability	<ul style="list-style-type: none"> The data collected is reliable as it is obtained directly from the party.
(c) Following are the demerits of telephonic interviews:	
(1) Limited Use	<ul style="list-style-type: none"> The disadvantage of this method is accessible to people. This method is not possible for people who do not own a telephone or mobile.

(2) Visual Feedback Is Not Possible	<ul style="list-style-type: none"> • Telephone Interviews also obstruct visual reactions of the respondents, which become helpful in obtaining information on sensitive issues.
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5. Mailed Questionnaire Method

(A) Mailed Questionnaire Method	<ul style="list-style-type: none"> • Under this method, a questionnaire containing a number of questions related to the investigation is prepared. • It is then sent to Informants by post along with the instructions to fill. • The Informant after filling up the questionnaire sends it back to the Investigator.
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merits of the mailed questionnaire method:

(1) Wide Coverage	<ul style="list-style-type: none"> • This method is useful where the field of investigation is very wide and the information is to be collected from different parts of the country.
(2) Economical	<ul style="list-style-type: none"> • This method is quite economical as it requires less money and labour.
(3) Originality	<ul style="list-style-type: none"> • The data are very much original because informants are directly involved in the collection of data.
(4) Free From Bias	<ul style="list-style-type: none"> • Every question is interpreted by the respondent in his own way. Hence, it is free from the personal bias of the Investigator.
(5) Maintains Secrecy	<ul style="list-style-type: none"> • This method is suitable for sensitive questions and maintains the anonymity of respondents.

demerits of the mailed questionnaire method:

(1) Limited Scope	<ul style="list-style-type: none"> • This method is applicable only where respondents are educated.
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(2) Less Response	<ul style="list-style-type: none"> • Most informants do not return the questionnaire. • The informants are least interested in the investigation; hence there is a lack of response from their sides.
(3) Chance Of Misinterpretation	<ul style="list-style-type: none"> • Informants may not understand the correct sense of questions, and may not answer such questions. Sometimes, informants may provide vague and ambiguous answers.
(4) Time-consuming	<ul style="list-style-type: none"> • The process is time-consuming, particularly when the information is to be obtained by post.

**Q.2- What is a questionnaire? State the prerequisites of the good questionnaire. OR
What are the qualities of a good questionnaire?**

Answer:

(A) Meaning Of Questionnaire	The questionnaire is a list or set of printed questions which are filled by the Informants. If it is filled by the Enumerators, it is called a Schedule.
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(b) A good questionnaire should have the following characteristics:

(1) Simple & Short Questions	Questions should be short, simple and straight forward.
(2) Limited Questions In Proper Order	The number of questions should be limited and these should be in a logical order.
(3) Clear Instructions	To assist the informant clear instructions should be given wherever required.
(4) Pre-testing	To know the shortcomings of Questionnaire, it should be tried on a small selected group.
(5) Avoid Mathematical Calculations	Questions containing mathematical calculations should be completely avoided.
(6) Avoid Personal Or Controversial Questions	Personal questions affecting sentiments and controversial questions related to religion, politics etc. should be avoided.

(7) Secrecy Assurance	Respondents should be given assurance that their response will be not be shared with anyone.
(8) Covering Letter	To convey the purpose of and how it will help the parties involved, a precise covering letter should be enclosed.

Collection Of Secondary Data

Q.1- What is secondary data? Briefly discuss the various source of secondary data.	
Answer:	
(A) Meaning Of Secondary Data	<ul style="list-style-type: none"> • Secondary data refers to those data which have already been collected by some other person or agency and used by us.
(b) sources of secondary data can broadly be classified under two Categories:	
1. Published sources 2. Unpublished sources	
(1)Published Sources	<p>Published sources mean data available in printed form. It includes:</p> <ol style="list-style-type: none"> 1. Magazines, Journals & Periodicals published by various Government, Semi-government and Private organisations. Like, data related to birth, death, education etc. by the government at various levels; data regarding Prices, Production etc. published by Economic Times, Financial Express etc. 2. Reports of various Committees or Commissions. Like, report of Pay Commission Report, Finance Commission Report etc. 3. Reports of International Agencies- Reports are regularly published by agencies like UNO, WHO, I.M.F. etc.
(2) Unpublished Sources	<ul style="list-style-type: none"> • All statistical material is not always published. • This category included. Records maintained by various government and private offices.ii. Research studies were done by scholar students or some institutions.iii. Reports prepared by Private Investigation companies etc. Such sources can also be used depending upon the need.

Q.2- What precautions shall we take while using secondary data? Explain.

Answer:

Following are the main precautions to be taken while using secondary data:

(1) Reliable Agency	<ul style="list-style-type: none">• We must ensure the agency that has published the data should be reliable.
(2) Suitability For The Purpose Of Enquiry	<ul style="list-style-type: none">• The Investigator must ensure that the data are suitable for the purpose of the present enquiry.• The suitability of the data is determined by investigating the nature, objectives, time of collection etc. of the secondary data.
(3) Adequacy And Accuracy To Avoid Impact Of Bias	<ul style="list-style-type: none">• It is necessary to use adequate data to avoid biases and prejudices leading to incorrect conclusions.
(4) Method Of Collecting Data Used	<ul style="list-style-type: none">• The investigator should also ascertain as to what method was used in collecting the data.• Sampling method may be biased depending upon the mode of selection of samples.• All these should be ascertained before making use of the secondary data.

Difference between Primary and Secondary Data :

S.NO	PRIMARY DATA	SECONDARY DATA
1.	Primary data is the first data collected by a researcher for the first time.	Whereas secondary data is a data that is already collected by someone earlier.
2.	Primary data is called real-time data.	While this is not real-time data, it is related to the past.
3.	The process is very much involved in collecting primary data.	While collecting secondary data it does not involve much process but rather quickly and easily.
4.	Primary data is cost effective.	While it is economical.
5.	The primary data takes long time for collection.	While secondary data takes shorter time than primary data for collection.
6.	Primary data is available in crud form.	While it is available in processed or refined form.
7.	Primary data is more accurate than secondary data.	While it is less accurate than primary data.

S.NO PRIMARY DATA

SECONDARY DATA

8. Primary data is more reliable than secondary data.

While secondary data is less reliable than primary data.

9. There is also difficulty in collecting data.

While there is no difficulty in collecting data.

Survey research definition

A survey is a research method used for collecting data from a predefined group of respondents to gain information.

Survey research methods

- **Online/ Email:** Online survey research is one of the most popular survey research methods today. The cost involved in online survey research is extremely minimal, and the responses gathered are highly accurate.
- **Phone:** Survey research conducted over the telephone (CATI) can be useful in collecting data from a more extensive section of the target population. There are chances that the money invested in phone surveys will be higher than other mediums, and the time required will be higher.
- **Face-to-face:** Researchers conduct face-to-face in-depth interviews in situations where there is a complicated problem to solve. The response rate for this method is the highest, but it can be costly.

Further, based on the time taken, survey research can be classified into two methods:

- **Longitudinal survey research:** Longitudinal survey research involves conducting survey research over a continuum of time and spread across years and decades. The data

collected using this survey research method from one time period to another is qualitative or quantitative. Respondent behavior, preferences, attitudes are continuously observed over time to analyze reasons for a change in behavior or preferences. For example, suppose a researcher intends to learn about the eating habits of teenagers. In that case, he/she will follow a sample of teenagers over a considerable period to ensure that the collected information is reliable. Often, cross-sectional survey research follows a longitudinal survey research study.

- **Cross-sectional survey research:** Researchers conduct a cross-sectional survey to collect insights from a target audience at a particular time interval. This survey research method is implemented in various sectors such as retail, education, healthcare, SME businesses, etc. Cross-sectional survey research can either be descriptive or analytical. It is quick and helps researchers collect information in a brief period. Researchers rely on cross-sectional survey research method in situations where descriptive analysis of a subject is required.

Process of implementing survey research methods:

- **Decide survey questions:** Brainstorm and put together valid survey questions that are grammatically and logically appropriate. Understanding the objective and expected outcomes of the survey helps a lot. There are many surveys where details of responses are not as important as gaining insights about what customers prefer from the provided options. In such situations, a researcher can include multiple-choice questions or closed-ended questions. Whereas, if researchers need to obtain details about specific issues, they can consist of open-ended questions to the questionnaire. Ideally, the surveys should include a smart balance of open-ended and closed-ended questions. Use survey questions like Likert Scale, Semantic Scale, Net Promoter Score question, etc. to avoid fence-sitting.
- **Finalize a target audience:** Send out relevant surveys as per the target audience and filter out irrelevant questions as per the requirement. The survey research will be

instrumental in case the target population decides a sample. This way, results can be according to the desired market and be generalized to the entire population

- **Send out surveys via decided mediums:** Distribute the surveys to the target audience and patiently wait for the feedback and comments- this is the most crucial step of the survey research. The survey needs to be scheduled, keeping in mind the nature of the target audience and its regions. Surveys can be conducted via email, embedded in a website, shared via social media, etc. to gain maximum responses.
- **Analyze survey results:** Analyze the feedback in real-time and identify patterns in the responses which might lead to a much-needed breakthrough for your organization. Cross tabulation, and many such survey feedback analysis methods can be used to spot and shed light on respondent behavior. Researchers can use the results to implement corrective measures to improve customer/employee satisfaction.

Reasons to conduct survey research

- **Understand respondent behavior to get solutions to your queries:** If you've carefully a survey, the respondents will provide insights about what they like about your organization as well as suggestions for improvement. To motivate them to respond, you must be very vocal about how secure their responses will be and how you will utilize the answers.
- **Present a medium for discussion:** A survey can be the perfect platform for respondents to provide criticism or applause for an organization. Important topics like product quality or quality of customer service etc. can be put on the table for discussion.
- **Strategy for never-ending improvements:** An organization can establish the target audience's attributes from the pilot phase of survey research. Researchers can use the criticism and feedback received from this survey to improve the product/services.

Survey research scaling techniques:

There are four main scales for measurement of variables:

- **Nominal Scale:** A nominal scale associates numbers with variables for mere naming or labeling, and the numbers usually have no other relevance. It is the most basic of the four levels of measurement.
- **Ordinal Scale:** The ordinal scale has an innate (inborn/natural) order within the variables along with labels. It establishes the rank between the variables of a scale but not the difference value between the variables.
- **Interval Scale:** The interval scale is a step ahead in comparison to the other two scales. Along with establishing a rank and name of variables, the scale also makes known the difference between the two variables. The only drawback is that there is no fixed start point of the scale, i.e., the actual zero value is absent.
- **Ratio Scale:** The ratio scale is the most advanced measurement scale, which has variables that are labeled in order and have a calculated difference between variables. In addition to what interval scale orders, this scale has a fixed starting point, i.e., the actual zero value is present.

Survey research design

There are five stages of survey research design:

- **Decide an aim of the research:** There can be multiple reasons for a researcher to conduct a survey, but they need to decide a purpose for research. This is the primary stage of survey research as it can mold the entire path of a survey, impacting its results.
- **Filter the sample from target population:** Who to target? is an essential question that a researcher should answer and keep in mind while conducting research. The precision of the results is driven by who the members of a sample are and how useful their opinions are.
- **Zero-in on a survey method:** Many qualitative and quantitative research methods can be discussed and decided. Focus groups, online interviews, surveys, polls, questionnaires, etc. can be carried out with the pre-decided sample of individuals.
- **Design the questionnaire:** What will the content of the survey be? A researcher is required to answer this question to be able to design it effectively. What will the content of the cover letter be? Or what are the survey questions of this questionnaire? Understand the target market thoroughly to create a questionnaire that targets a sample to gain insights about a survey research topic.
- **Send out surveys and analyze results:** Once the researcher decides on which questions to include in a study, they can send it across to the selected sample. Answers obtained for this survey can be analyzed to make product-related or marketing-related decisions.

What is Data Analysis?

Data analysis is defined as a process of cleaning, transforming, and modeling data to discover useful information for business decision-making. The purpose of Data Analysis is to extract useful information from data and taking the decision based upon the data analysis.

Types of Data Analysis: Techniques and Methods

There are several **types of Data Analysis** techniques that exist based on business and technology. However, the major types of data analysis are:

- Text Analysis
- Statistical Analysis
- Diagnostic Analysis
- Predictive Analysis
- Prescriptive Analysis

Text Analysis

Text Analysis is also referred to as Data Mining. It is a method to discover a pattern in large data sets using databases or data mining tools. It used to transform raw data into business information. Business Intelligence tools are present in the market which is used to take strategic business decisions. Overall it offers a way to extract and examine data and deriving patterns and finally interpretation of the data.

Statistical Analysis

Statistical Analysis shows "What happen?" by using past data in the form of dashboards. Statistical Analysis includes collection, Analysis, interpretation, presentation, and modeling of data. It analyses a set of data or a sample of data. There are two categories of this type of Analysis - Descriptive Analysis and Inferential Analysis.

Descriptive Analysis

analyses complete data or a sample of summarized numerical data. It shows mean and deviation for continuous data whereas percentage and frequency for categorical data.

Inferential Analysis

analyses sample from complete data. In this type of Analysis, you can find different conclusions from the same data by selecting different samples.

Diagnostic Analysis

Diagnostic Analysis shows "Why did it happen?" by finding the cause from the insight found in Statistical Analysis. This Analysis is useful to identify behavior patterns of data. If a new problem arrives in your business process, then you can look into this Analysis to find similar patterns of that problem. And it may have chances to use similar prescriptions for the new problems.

Predictive Analysis

Predictive Analysis shows "what is likely to happen" by using previous data. The simplest example is like if last year I bought two dresses based on my savings and if this year my salary is increasing double then I can buy four dresses. But of course it's not easy like this because you have to think about other circumstances like chances of prices of clothes is increased this year or maybe instead of dresses you want to buy a new bike, or you need to buy a house!

So here, this Analysis makes predictions about future outcomes based on current or past data. Forecasting is just an estimate. Its accuracy is based on how much detailed information you have and how much you dig in it.

Prescriptive Analysis

Prescriptive Analysis combines the insight from all previous Analysis to determine which action to take in a current problem or decision. Most data-driven companies are utilizing Prescriptive Analysis because predictive and descriptive Analysis are not enough to improve data performance. Based on current situations and problems, they analyze the data and make decisions.

Data Analysis Process

Data Analysis consists of the following phases:

- Data Requirement Gathering
- Data Collection
- Data Cleaning
- Data Analysis
- Data Interpretation
- Data Visualization

Data Requirement Gathering

First of all, you have to think about why do you want to do this data analysis? All you need to find out the purpose or aim of doing the Analysis. You have to decide which type of data analysis you wanted to do! In this phase, you have to decide what to analyze and how to measure it, you have to understand why you are investigating and what measures you have to use to do this Analysis.

Data Collection

After requirement gathering, you will get a clear idea about what things you have to measure and what should be your findings. Now it's time to collect your data based on requirements. Once you collect your data, remember that the collected data must be processed or organized for Analysis. As you collected data from various sources, you must have to keep a log with a collection date and source of the data.

Data Cleaning

Now whatever data is collected may not be useful or irrelevant to your aim of Analysis, hence it should be cleaned. The data which is collected may contain duplicate records, white spaces or errors. The data should be cleaned and error free. This phase must be done before Analysis because based on data cleaning, your output of Analysis will be closer to your expected outcome.

Data Analysis

Once the data is collected, cleaned, and processed, it is ready for Analysis. As you manipulate data, you may find you have the exact information you need, or you might need to collect more data. During this phase, you can use data analysis tools and software which will help you to understand, interpret, and derive conclusions based on the requirements.

Data Interpretation

After analyzing your data, it's finally time to interpret your results. You can choose the way to express or communicate your data analysis either you can use simply in words or maybe a table or chart. Then use the results of your data analysis process to decide your best course of action.

Data Visualization

Data visualization is very common in your day to day life; they often appear in the form of charts and graphs. In other words, data shown graphically so that it will be easier for the human brain to understand and process it. Data visualization often used to discover

unknown facts and trends. By observing relationships and comparing datasets, you can find a way to find out meaningful information.

What Is Data Interpretation?

Data interpretation refers to the implementation of processes through which data is reviewed for the purpose of arriving at an informed conclusion. The interpretation of data assigns a meaning to the information analyzed and determines its signification and implications.

The two main methods of interpretation of data: with a qualitative and a quantitative analysis.

Qualitative Data Interpretation

Qualitative data analysis can be summed up in one word – categorical. With qualitative analysis, data is not described through numerical values or patterns, but through the use of descriptive context (i.e., text). Typically, narrative data is gathered by employing a wide variety of person-to-person techniques. These techniques include:

- **Observations:** detailing behavioral patterns that occur within an observation group. These patterns could be the amount of time spent in an activity, the type of activity and the method of communication employed.
- **Documents:** much like how patterns of behavior can be observed, different types of documentation resources can be coded and divided based on the type of material they contain.
- **Interviews:** one of the best collection methods for narrative data. Enquiry responses can be grouped by theme, topic or category. The interview approach allows for highly-focused data segmentation.

Quantitative Data Interpretation

If quantitative data interpretation could be summed up in one word (and it really can't) that word would be “numerical.” There are few certainties when it comes to data analysis, but you can be sure that if the research you are engaging in has no numbers involved, it is not quantitative research.

- **Mean:** a mean represents a numerical average for a set of responses. When dealing with a data set (or multiple data sets), a mean will represent a central value of a specific set of numbers. It is the sum of the values divided by the number of

values within the data set. Other terms that can be used to describe the concept are arithmetic mean, average and mathematical expectation.

- **Standard deviation:** this is another statistical term commonly appearing in quantitative analysis. Standard deviation reveals the distribution of the responses around the mean. It describes the degree of consistency within the responses; together with the mean, it provides insight into data sets.
- **Frequency distribution:** this is a measurement gauging the rate of a response appearance within a data set. When using a survey, for example, frequency distribution has the capability of determining the number of times a specific ordinal scale response appears (i.e., agree, strongly agree, disagree, etc.). Frequency distribution is extremely keen in determining the degree of consensus among data points.

Unit – V

Unit – V Report Writing: Structure of Research Report – Problems of Report Writing – Qualities of a Good Report – Contents of the Report - Documentation of Report.

STRUCTURE AND CONTENTS OF A RESEARCH REPORT

A research report has a different structure and layout in comparison to a project report.

STRUCTURE OF A RESEARCH REPORT

A research report has a different structure and layout in comparison to a project report. A research report is for reference and is often quite a long document. It has to be clearly structured for the readers to quickly find the information wanted. It needs to be planned carefully to make sure that the information given in the report is put under correct headings.

PARTS OF RESEARCH REPORT

Cover sheet: This should contain some or all of the following:

Full title of the report

Name of the researcher

Name of the unit of which the project is a part Name of the institution

Date/year.

Title page: Full title of the report.

Your name

Acknowledgement: a thanks giving to the people who helped you.

Contents

List of the Tables

Headings and sub-headings used in the report should be given with their page numbers. Each chapter should begin on a new page. Use a consistent system in dividing the report into parts. The simplest may be to use chapters for each major part and subdivide these into sections and sub-sections. 1, 2, 3 etc. Can be used as the numbers for each chapter. The sections of chapter 3 (for example) would be 3.1, 3.2, 3.3, and so on. For further sub-division of a sub-section you may use 3.2.1, 3.2.2, and so on.

Abstract or Summary or Executive Summary or Introduction:

This presents an overview of the whole report. It should let the reader see in advance, what is in the report. This includes what you set out to do, how review of literature is focused and narrowed in your research, the relation of the methodology you chose to your objectives, a summary of your findings and analysis of the findings

BODY

Aims And Purpose or Aims And Objectives:

Why did you do this work? What was the problem you were investigating? If you are not including review of literature, mention the specific research/es which is/are relevant to your work.

Review of Literature

This should help to put your research into a background context and to explain its importance. Include only the books and articles which relate directly to your topic. You need to be analytical and critical, and not just describe the works that you have read.

Methodology

Methodology deals with the methods and principles used in an activity, in this case research. In the methodology chapter, explain the method/s you used for the research and why you thought they were the appropriate ones. You may, for example, be depending

mostly upon secondary data or you might have collected your own data. You should explain the method of data collection, materials used, subjects interviewed, or places you visited. Give a detailed account of how and when you carried out your research and explain why you used the particular method/s, rather than other methods. Included in this chapter should be an examination of ethical issues, if any.

Results or Findings

What did you find out? Give a clear presentation of your results. Show the essential data and calculations here. You may use tables, graphs and figures.

Analysis and Discussion

Interpret your results. What do you make out of them? How do they compare with those of others who have done research in this area? The accuracy of your measurements/results should be discussed and deficiencies, if any, in the research design should be mentioned.

Conclusions

What do you conclude? Summarize briefly the main conclusions which you discussed under "Results." were you able to answer some or all of the questions which you raised in your aims and objectives? Do not be tempted to draw conclusions which are not backed up by your evidence. Note the deviation/s from expected results and any failure to achieve all that you had hoped.

Recommendations

Make your recommendations, if required. The suggestions for action and further research should be given.

Appendix

You may not need an appendix, or you may need several. If you have used questionnaires, it is usual to include a blank copy in the appendix. You could include data or calculations, not given in the body, that are necessary, or useful, to get the full benefit from your report. There may be maps, drawings, photographs or plans that you want to include. If you have used special equipment, you may include information about it.

The plural of an **appendix** is **appendices**. If an appendix or appendices are needed, design them thoughtfully in a way that your readers find it/them convenient to use.

References

List all the sources which you referred in the body of the report. You may use the pattern prescribed by American Psychological Association, or any other standard pattern recognized internationally.

REVIEW OF LITERATURE

In the case of small projects, this may not be in the form of a critical review of the literature, but this is often asked for and is a standard part of larger projects. Sometimes students are asked to write Review of Literature on a topic as a piece of work in its own right. In its simplest form, the review of literature is a list of relevant books and other sources, each followed by a description and comment on its relevance.

The literature review should demonstrate that you have read and analysed the literature relevant to your topic. From your readings, you may get ideas about methods of data collection and analysis. If the review is part of a project, you will be required to relate your readings to the issues in the project, and while describing the readings, you should apply them to your topic. A review should include only relevant studies. The review should provide the reader with a picture of the state of knowledge in the subject.

Your literature search should establish what previous researches have been carried out in the subject area. Broadly speaking, there are three kinds of sources that you should consult:

1. Introductory material;

2. Journal articles and

3. Books.

To get an idea about the background of your topic, you may consult one or more textbooks at the appropriate time. It is a good practice to review in cumulative stages - that is, do not think you can do it all at one go. Keep a careful record of what you have searched, how you have gone about it, and the exact citations and page numbers of your readings. Write notes as you go along. Record suitable notes on everything you read and note the methods of investigations. Make sure that you keep a full reference, complete with page numbers. You will have to find your own balance between taking notes that are too long and detailed, and ones too brief to be of any use. It is best to write your notes in complete sentences and paragraphs, because research has shown that you are more likely to understand your notes later if they are written in a way that other people would understand. Keep your notes from different sources and/or about different points on separate index cards or on separate sheets of paper. You will do mainly basic reading while you are trying to decide on your topic. You may scan and make notes on the abstracts or summaries of work in the area. Then do a more thorough job of reading later on, when you are more confident of what you are doing. If your project spans several months, it would be advisable towards the end to check whether there are any new and recent references.

REFERENCES

There are many methods of referencing your work; some of the most common ones are the numbered style, american psychological association style and the harvard method, with many other variations. Just use the one you are most familiar and comfortable with. Details of all the works referred by you should be given in the reference section.

THE PRESENTATION OF REPORT

Well-produced, appropriate illustrations enhance the presentability of a report. With today's computer packages, almost anything is possible. However, histograms, bar charts and pie charts are still the three 'staples'. Readers like illustrated information, because it is easier to absorb and it's more memorable. Illustrations are useful only when they are easier to understand than words or figures and they must be relevant to the text. Use the *algorithm* included to help you decide whether or not to use an illustration. They should never be included for their own sake, and don't overdo it; too many illustrations distract the attention of readers.

Problems of Report Writing:

1. Don't start right with the introduction

You normally start any written project with an introduction. However, when you are writing a report, you need first to write an abstract. This is called the executive summary, and it basically sums up the contents of your report. A very good trick is to actually write your executive summary after you have written your entire report.

2. Writing a report without a clear structure

Many make the mistake of writing the report without clear subheadings or chapters. Before you even start writing, you should delimitate your report and categorize it as follows: Abstract, Introduction, Background, Method, Findings, Strength, Weaknesses, Opportunities, Threats, Conclusions and Recommendations. If you will follow such an outline for your report, you will certainly be able to write a very intelligent and useful report to senior management. Follow these guidelines and you will also write much easier.

3. Grammar & Stylistic mistakes in Recommendations

You need to be very careful when writing the Recommendations section. This is basically your proposal formulated towards management. This is where you will show your superiors that you know what changes are needed in order to make the company run better. Therefore, use often power words and show confidence throughout your writing. If you are not sure that you have written a good report, you can hire the writing service company and ask the experts there to proofread and edit your document professionally. This will help you hand in your document with a higher degree of confidence.

4. Writing a report that is too short

A very short report will only prove that you didn't spend enough time on research and analyzing the problem. Instead, make your report as long as it should take in order to detail everything nicely. You need enough space on paper to explain each and every

point, so don't rush. You also want a good feedback from management, so write as long as you need to explain the problem and to offer recommendations.

5. Not spending enough time on research

You don't have to write a report from one day to the other. You are notified in time, so you should start your research immediately. Report writing is not easy, and you need to collect plenty of data, analyze it closely, find the mistakes, and come up with potential efficient solutions. Senior management will immediately understand if you spent only 3 hours in a rush to write your report, or if you invested a lot of effort. Writing a really good report can take even up to three weeks of in depth research. Don't rush it.

6. Writing in a literary way

A report is not an essay, and it is not literature or fiction. You should definitely use highly technical language and common phrases to your industry. If you write a report in the banking sector, you will need to research important financial terms and use them within your report.

7. Excessive usage of colors and graphs

Remember, your report is not a painting, nor a piece for a drawing competition. Refrain yourself from using all the colors of the rainbow in your report. Instead, use smart graphics that have 1 or 2 colors (black/red, black/yellow highlights, black/orange) in order to make some differentiations. The graphics should not be too complicated, but easy and quick to understand by whomever looks at them. If you can't explain your theory in one single graph, then it is better to create several graphics each pointing out one problem. The entire report should have that logical flow and industry specific language that makes it a professional report.

Qualities of a Good Report

1. Good Report has a Clarity of Thought: A good report is one which is drafted in a simple, clear and lucid language. Its language should not be difficult and confusing. There should be no ambiguity as regards the statements made in the report. A reader should be able to understand the entire report easily, exactly and quickly. In fact, this is the basic purpose of report writing.

2. Good Report is complete and Self-explanatory: A good report is always a complete and self-explanatory document. For this, repetition of facts, figures, information, conclusions and recommendation should be avoided. Report writing should be always complete and self-explanatory. It should give complete information to the readers in a precise manner.

3. Good Report is Comprehensive but Compact: A lengthy report is not necessarily a good report. In fact, report should be a brief and compact document. At the same time, it should give complete picture of the problem under investigation. In this sense the report writing should be comprehensive but compact.

4. Good Report is Accurate in all Aspects: One more feature of a good report is that it should be correct in all aspects. The data given and statements made in the report must be based on facts and must be verified carefully. Report writing is a responsible job as report is used as a reliable document for taking decisions and framing policies. Thus, report writing should be always accurate, factual and reliable.

5. Good Report has Suitable Format for readers: A good report needs proper format. It should be convenient to the type of the report. The report should have all essential components such as title, introduction, findings and recommendations. This gives convenience to the reader.

6. Good Report Support Facts and is Factual: A good report is always factual. The findings, conclusions and recommendations included in the report should be supported by information and data collected from reliable sources. Statistical tables should support statements made in the report. Attention needs to be given to this reliability aspect in report writing.

7. Good Report has an Impersonal Style: A good report should be drafted in an impersonal manner. The report writing should be in third person. This is necessary as the report is prepared for the benefits of a person who needs it and not for the benefit of the person who prepares it.

8. Good Report has a Proper Date and Signature: A good report should be properly dated and signed by the concerned authority or by the chairman of the committee or by all committee members. This has legal significance and needs special attention in report writing.

9. Good Report has a Reference to Relevant Details: In effective report writing, reference to relevant details is necessary. A good report should cover all relevant details for the methodology used, questionnaire prepared for data collection and the procedure followed by the committee.

10. Good Report has all Essential Technical Details: In a good report writing attention should be given to certain essential technical details. For example, the pages and paragraphs of the report should be numbered properly. Marginal heading and titles should be given. This gives convenience to readers

DOCUMENTATION OF REPORT

Documentation

- Serves as a permanent record of client information and care.

Reporting

- Takes place when two or more people share information about client care, either face to face or by telephone

Guidelines for Good Documentation and Reporting

1. Fact – information about clients and their care must be factual. A record should contain descriptive, objective information about what a nurse sees, hears, feels and smells
2. Accuracy – information must be accurate so that health team members have confidence in it
3. Completeness – the information within a record or a report should be complete, containing concise and thorough information about a client's care. Concise data are easy to understand
4. Currentness – ongoing decisions about care must be based on currently reported information.

Documentation

- Anything written or printed that is relied on as a record of proof for authorized persons.

Purposes of Records

1. Communication
2. Planning Client Care
3. Auditing Health Agencies
4. Research
5. Education
6. Reimbursement
7. Legal Documentation
8. Health Care Analysis

Documentation Systems

1. Source – Oriented Record
 - a. The traditional client record
 - b. Each person or department makes notations in a separate section or sections of the client's chart
 - c. It is convenient because care providers from each discipline can easily locate the forms on which to record data and it is easy to trace the information
 - d. Example: the admissions department has an admission sheet; the physician has a physician's order sheet, a physician's history sheet & progress notes
 - e. NARRATIVE CHARTING is a traditional part of the source-oriented record
 1. **Example: SOAP Format or SOAPIE and SOAPIER**
 - S – Subjective data
 - O – Objective data
 - A – Assessment
 - P – Plan
 - I – Intervention
 - E – Evaluation
 - R- Revision