

Chapter 1 - Introduction

1.1 Meaning and Objectives of Research

Meaning Of Research:

Research in simple terms refers to search for knowledge. It is a scientific and systematic search for information on a particular topic or issue. It is also known as the art of scientific investigation. Several social scientists have defined research in different ways. In the *Encyclopedia of Social Sciences*, D. Slesinger and M. Stephenson (1930) defined research as “the manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify knowledge, whether that knowledge aids in the construction of theory or in the practice of an art”.

According to Redman and Mory (1923), research is a “systematized effort to gain new knowledge”. It is an academic activity and therefore the term should be used in a technical sense. According to Clifford Woody (Kothari, 1988), research comprises “defining and redefining problems, formulating hypotheses or suggested solutions; collecting, organizing and evaluating data; making deductions and reaching conclusions; and finally, carefully testing the conclusions to determine whether they fit the formulated hypotheses”.

Thus, research is an original addition to the available knowledge, which contributes to its further advancement. It is an attempt to pursue truth through the methods of study, observation, comparison and experiment. In sum, research is the search for knowledge, using objective and systematic methods to find solution to a problem.

Objectives Of Research:

The objective of research is to find answers to the questions by applying scientific procedures. In other words, the main aim of research is to find out the truth which is hidden and has not yet been discovered. Although every research study has its own specific objectives, the research objectives may be broadly grouped as follows:

1. To gain familiarity with new insights into a phenomenon (i.e., formulative research studies);
2. To accurately portray the characteristics of a particular individual, group, or a situation (i.e., descriptive research studies);
3. To analyse the frequency with which something occurs (i.e., diagnostic research studies);
4. To examine the hypothesis of a causal relationship between two variables (i.e., hypothesis-testing research studies).

1.2 Research Methods Versus Methodology

Research Methods Versus Methodology:

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Research methods include all those techniques/methods that are adopted for conducting research. Thus, research techniques or methods are the methods that the researchers adopt for conducting the research studies.

on the other hand, research methodology is the way in which research problems are solved systematically. It is a science of studying how research is conducted scientifically. Under it, the researcher acquaints himself/herself with the various steps generally adopted to study a research problem, along with the underlying logic behind them. Hence, it is not only important for the researcher to know the research techniques/ methods, but also the scientific approach called methodology.

THE DIFFERENCE BETWEEN METHODS AND TECHNIQUES OF DATA COLLECTION

<i>Type</i>	<i>Methods</i>	<i>Techniques</i>
1. Library Research	(i) Analysis of historical records (ii) Analysis of documents	Recording of notes, Content analysis, Tape and Film listening and analysis. Statistical compilations and manipulations, reference and abstract guides, contents analysis.
2. Field Research	(i) Non-participant direct observation (ii) Participant observation (iii) Mass observation (iv) Mail questionnaire (v) Opinionnaire (vi) Personal interview (vii) Focused interview (viii) Group interview (ix) Telephone survey (x) Case study and life history	Observational behavioural scales, use of score cards, etc. Interactional recording, possible use of tape recorders, photo graphic techniques. Recording mass behaviour, interview using independent observers in public places. Identification of social and economic background of respondents. Use of attitude scales, projective techniques, use of sociometric scales. Interviewer uses a detailed schedule with open and closed questions. Interviewer focuses attention upon a given experience and its effects. Small groups of respondents are interviewed simultaneously. Used as a survey technique for information and for discerning opinion; may also be used as a follow up of questionnaire. Cross sectional collection of data for intensive analysis, longitudinal collection of data of intensive character.
3. Laboratory Research	Small group study of random behaviour, play and role analysis	Use of audio-visual recording devices, use of observers, etc.

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Scientific community

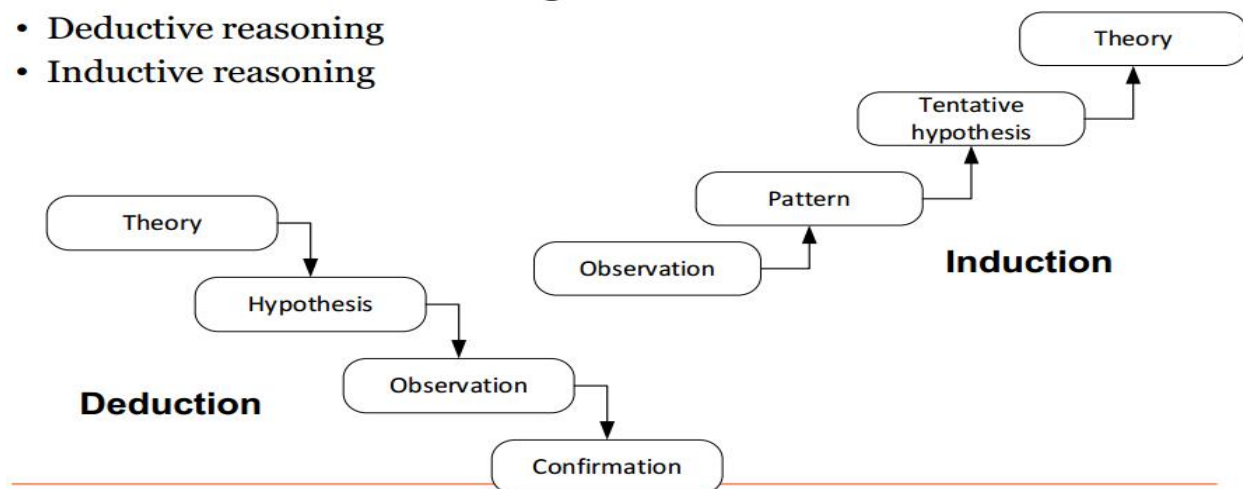
- The group of all interacting scientists
- Many sub-communities in many levels on particular fields
- Also: interdisciplinary communities
- Who decides what research is valid and of high quality?
 - Answer: the scientific community
 - There is a hierarchy, but also independency and peer review
- Peer review
 - Most research writings are selected for publication by peer review
 - Typically 2-4 competent reviewers evaluate the manuscript
- Important results provoke intensive discussion and counter-publications
- In some fields (but not in all!) the results must be repeated by independent Researchers before they are generally accepted.

Some important scientific terms

- Deduction and induction, the problem of induction, falsifiability
- Accumulation of knowledge and scientific revolutions
- Theory, Validity

Two basic forms of reasoning

- Deductive reasoning
- Inductive reasoning



Deduction and induction (2)

Deductive reasoning

All Frenchmen like red wine

Pierre is a Frenchman

→ Therefore, Pierre likes red wine

Inductive reasoning

The first five eggs in the box were rotten

All the eggs have the same best-before date stamped on them

→ Therefore, the sixth egg will be rotten too

The problem of induction

The famous example

- “All swans are white”
 - *This was confirmed true by observing individual swans = induction*
 - *Until a black swan species was found from Southern Australia*

Induction cannot prove something 100% true

- This problem applies to most research!
 - *“Genetically modified maize is safe for humans”*
 - Tested with a large number of humans and none of them suffered any problems
 - *Most statistical research use a sample of a population*
 - Sometimes it is possible to use the whole population
 - *All qualitative research (more later) is based on induction*

Karl Popper’s (1934) solution: all scientific theories must be falsifiable

- A single experiment or observation can falsify a theory

Falsifiability

- Karl Popper (1934), “Logik der Forschung”
- Also: refutability
- Empirical theories are characterized by falsifiability
 - *It must be possible to prove a scientific theory false*
- An asymmetry between verifiability and falsifiability
 - *One contradictory observation is enough to falsify a universal statement (“all swans are white”)*
 - *How many observations are needed to verify a universal statement?*

Accumulation of knowledge

Ideal: science constructs a coherent and consistent theory on which knowledge is accumulated over time. The knowledge and theory approaches perfection over time.

Two problems

- Scientific revolutions
- It is not always possible to fully agree on a coherent and consistent theory (e.g. in human sciences)
 - *The observation and results require interpretation of human action*

Thomas Kuhn: “The Structure of Scientific Revolutions” (1962)

- “Normal science” accumulates knowledge (normal = dominant paradigm)
- Anomalies cause a crisis and a scientific revolution, where the accumulated knowledge is not necessarily valid any more
- A paradigm shift and a new paradigm follows
 - *For example from Ptolemaic to Copernican cosmology*
 - *From aether theory to electromagnetic radiation*

1.3 Research Approaches

There are two main approaches to research, namely quantitative approach and qualitative approach. The quantitative approach involves the collection of quantitative data, which are put to rigorous quantitative analysis in a formal and rigid manner. This approach further includes experimental, inferential, and simulation approaches to research. Meanwhile, the qualitative approach uses the

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method of subjective assessment of opinions, behaviour and attitudes. Research in such a situation is a function of the researcher's impressions and insights. The results generated by this type of research are either in non-quantitative form or in the form which cannot be put to rigorous quantitative analysis. Usually, this approach uses techniques like indepth interviews, focus group interviews, and projective techniques.

1.4 Types Of Research

There are different types of research. The basic ones are as follows.

Descriptive Versus Analytical

Descriptive research consists of surveys and fact-finding enquiries of different types. The main objective of descriptive research is describing the state of affairs as it prevails at the time of study. The term 'ex post facto research' is quite often used for descriptive research studies in social sciences and business research. The most distinguishing feature of this method is that the researcher has no control over the variables here. He/she has to only report what is happening or what has happened. Majority of the ex post facto research projects are used for descriptive studies in which the researcher attempts to examine phenomena, such as the consumers' preferences, frequency of purchases, shopping, etc. Despite the inability of the researchers to control the variables, ex post facto studies may also comprise attempts by them to discover the causes of the selected problem. The methods of research adopted in conducting descriptive research are survey methods of all kinds, including correlational and comparative methods.

Meanwhile in the Analytical research, the researcher has to use the already available facts or information, and analyse them to make a critical evaluation of the subject.

Applied Versus Fundamental

Research can also be applied or fundamental in nature. An attempt to find a solution to an immediate problem encountered by a firm, an industry, a business organisation, or the society is known as applied research. Researchers engaged in such researches aim at drawing certain conclusions confronting a concrete social or business problem. On the other hand, fundamental research mainly concerns generalizations and formulation of a theory. In other words, "Gathering knowledge for knowledge's sake is termed 'pure' or 'basic' research" (Young in Kothari, 1988). Researches relating to pure mathematics or concerning some natural phenomenon are instances of Fundamental Research. Likewise, studies focusing on human behaviour also fall under the category of fundamental research. Thus, while the principal objective of applied research is to find a solution to some pressing practical problem, the objective of basic research is to find information with a broad base of application and add to the already existing organized body of scientific knowledge.

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Quantitative Versus Qualitative

Quantitative research relates to aspects that can be quantified or can be expressed in terms of quantity. It involves the measurement of quantity or amount. Various available statistical and econometric methods are adopted for analysis in such research. Which includes correlation, regressions and time series analysis etc. On the other hand, Qualitative research is concerned with qualitative phenomena, or more specifically, the aspects related to or involving quality or kind. For example, an important type of qualitative research is 'Motivation Research', which investigates into the reasons for certain human behaviour. The main aim of this type of research is discovering the underlying motives and desires of human beings by using in-depth interviews. The other techniques employed in such research are story completion tests, sentence completion tests, word association tests, and other similar projective methods. Qualitative research is particularly significant in the context of behavioural sciences, which aim at discovering the underlying motives of human behaviour. Such research helps to analyse the various factors that motivate human beings to behave in a certain manner, besides contributing to an understanding of what makes individuals like or dislike a particular thing. However, it is worth noting that conducting qualitative research in practice is considerably a difficult task. Hence, while undertaking such research, seeking guidance from experienced expert researchers is important.

Conceptual Versus Empirical

The research related to some abstract idea or theory is known as Conceptual Research. Generally, philosophers and thinkers use it for developing new concepts or for reinterpreting the existing ones. Empirical Research, on the other hand, exclusively relies on the observation or experience with hardly any regard for theory and system. Such research is data based, which often comes up with conclusions that can be verified through experiments or observation. Empirical research is also known as experimental type of research, in which it is important to first collect the facts and their sources, and actively take steps to stimulate the production of desired information. In this type of research, the researcher first formulates a working hypothesis, and then gathers sufficient facts to prove or disprove the stated hypothesis. He/she formulates the experimental design, which according to him/her would manipulate the variables, so as to obtain the desired information. This type of research is thus characterized by the researcher's control over the variables under study. In simple term, empirical research is most appropriate when an attempt is made to prove that certain variables influence the other variables in some way. Therefore, the results obtained by using the experimental or empirical studies are considered to be the most powerful evidences for a given hypothesis.

1.5 Importance Of Knowing How To Conduct Research

The importance of knowing how to conduct research are listed below:

1. The knowledge of research methodology provides training to new researchers and enables them to do research properly. It helps them to develop disciplined thinking or a 'bent of mind' to objectively observe the field;
2. The knowledge of doing research inculcates the ability to evaluate and utilize the research findings with confidence;

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3. The knowledge of research methodology equips the researcher with the tools that help him/her to make the observations objectively;
4. The knowledge of methodology helps the research consumers to evaluate research and make rational decisions.

1.6 Qualities Of A Researcher

It is important for a researcher to possess certain qualities to conduct research. First and foremost, he being a scientist should be firmly committed to the 'articles of faith' of the scientific methods of research. This implies that a researcher should be a social science person in the truest sense. Sir Michael Foster cited by (Wilkinson and Bhandarkar, 1979) identified a few distinct qualities of a scientist. According to him, a true research scientist should possess the following qualities:

1. First of all, the nature of a researcher must be of the temperament that vibrates in unison with the theme which he is searching. Hence, the seeker of knowledge must be truthful with truthfulness of nature, which is much more important, much more exacting than what is sometimes known as truthfulness. The truthfulness relates to the desire for accuracy of observation and precision of statement. Ensuring facts is the principle rule of science, which is not an easy matter. The difficulty may arise due to untrained eye, which fails to see anything beyond what it has the power of seeing and sometimes even less than that. This may also be due to the lack of discipline in the method of science. An unscientific individual often remains satisfied with the expressions like approximately, almost, or nearly, which is never what nature is. A real research cannot see two things which differ, however minutely, as the same.

2. A researcher must possess an alert mind. Nature is constantly changing and revealing itself through various ways. A scientific researcher must be keen and watchful to notice such changes, no matter how small or insignificant they may appear. Such receptivity has to be cultivated slowly and patiently over time by the researcher through practice. An individual who is ignorant or not alert and receptive during his research will not make a good researcher. He will fail as a good researcher if he has no keen eyes or mind to observe the unusual changes behind the routine. Research demands a systematic immersion into the subject matter by the researcher grasp even the slightest hint that may culminate into significant research problems. In this context, Cohen and Negal cited by (Selltiz et al, 1965; Wilkinson and Bhandarkar, 1979) state that "the ability to perceive in some brute experience the occasion of a problem is not a common talent among men... it is a mark of scientific genius to be sensitive to difficulties where less gifted people pass by untroubled by doubt".

3. Scientific enquiry is pre-eminently an intellectual effort. It requires the moral quality of courage, which reflects the courage of a steadfast endurance. The process of conducting research is not an easy task. There are occasions when a research scientist might feel defeated or completely lost. This is the stage when a researcher would need immense courage and the sense of conviction. The researcher must learn the art of enduring intellectual hardships. In the words of Darwin, "It's dogged that does it".

In order to cultivate the afore-mentioned three qualities of a researcher, a fourth one may be added. This is the quality of making statements cautiously. According to Huxley, the assertion that outstrips the evidence is not only a blunder but a crime (Thompson, 1975). A researcher should cultivate the habit of reserving judgment when the required data are insufficient.

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1.7 Significance of Research

According to a famous Hudson Maxim, “All progress is born of inquiry. Doubt is often better than overconfidence, for it leads to inquiry, and inquiry leads to invention”. It brings out the significance of research, increased amount of which makes the progress possible. Research encourages scientific and inductive thinking, besides promoting the development of logical habits of thinking and organisation. The role of research in applied economics in the context of an economy or business is greatly increasing in modern times. The increasingly complex nature of government and business has raised the use of research in solving operational problems. Research assumes significant role in the formulation of economic policy for both, the government and business. It provides the basis for almost all government policies of an economic system. Government budget formulation, for example, depends particularly on the analysis of needs and desires of people, and the availability of revenues, which requires research. Research helps to formulate alternative policies, in addition to examining the consequences of these alternatives. Thus, research also facilitates the decision-making of policy-makers, although in itself is not a part of research. In the process, research also helps in the proper allocation of a country's scarce resources.

Research is also necessary for collecting information on the social and economic structure of an economy to understand the process of change occurring in the country. Collection of statistical information, though not a routine task, involves various research problems. Therefore, large staff of research technicians or experts are engaged by the government these days to undertake this work. Thus, research as a tool of government economic policy formulation involves three distinct stages of operation: investigation of economic structure through continual compilation of facts; (ii) diagnosis of events that are taking place and analysis of the forces underlying them; and (iii) the prognosis i.e., the prediction of future developments (Wilkinson and Bhandarkar, 1979).

Research also assumes significance in solving various operational and planning problems associated with business and industry. In several ways, operations research, market research and motivational research are vital and their results assist in taking business decisions. Market research refers to the investigation of the structure and development of a market for the formulation of efficient policies relating to purchases, production and sales. Operational research relates to the application of logical, mathematical, and analytical techniques to find solution to business problems, such as cost minimization or profit maximization, or the optimization problems. Motivational research helps to determine why people behave in the manner they do with respect to market characteristics. More specifically, it is concerned with the analysis of the motivations underlying consumer behaviour. All these researches are very useful for business and industry, and are responsible for business decision-making.

Research is equally important to social scientists for analyzing the social relationships and seeking explanations to various social problems. It gives intellectual satisfaction of knowing things for the sake of knowledge. It also possesses the practical utility for the social scientist to gain knowledge so as to be able to do something better or in a more efficient manner. The research in social sciences is concerned

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with both knowledge for its own sake, and knowledge for what it can contribute to solve practical problems.

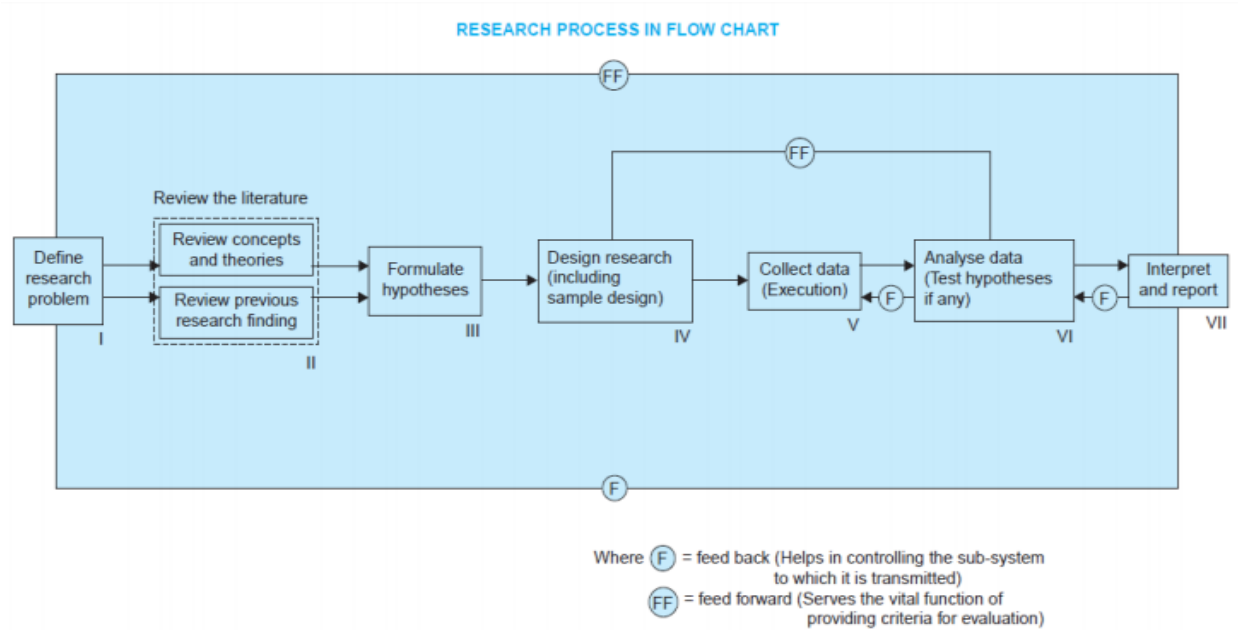
1.8 Research Process

Research process consists of a series of steps or actions required for effectively conducting research. The following are the steps that provide useful procedural guidelines regarding the conduct of research:

1. Formulating the research problem;
2. Extensive literature survey;
3. Developing hypothesis;
4. Preparing the research design;
5. Determining sample design;
6. Collecting data;
7. Execution of the project;
8. Analysis of data;
9. Hypothesis testing;
10. Generalization and interpretation, and
11. Preparation of the report or presentation of the results.

In other words, it involves the formal write-up of conclusions.

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1.9 Research Problem

The first and foremost stage in the research process is to select and properly define the research problem. A researcher should first identify a problem and formulate it, so as to make it amenable or susceptible to research. In general, a research problem refers to an unanswered question that a researcher might encounter in the context of either a theoretical or practical situation, which he/she would like to answer or find a solution to. There are two types of research problems, viz., those which relate to states of nature and those which relate to relationships between variables. Thus, the components of a research problem may be summarized as:

1. There should be an individual or a group who have some difficulty or problem.
2. There should be some objective(s) to be pursued. A person or an organization who wants nothing cannot have a problem.
3. There should be alternative ways of pursuing the objective the researcher wants to pursue. This implies that there should be more than one alternative means available to the researcher. This is because if the researcher has no choice of alternative means, he/she would not have a problem.
4. There should be some doubt in the mind of the researcher about the choice of alternative means. This implies that research should answer the question relating to the relative efficiency or suitability of the possible alternatives.
5. There should be a context to which the difficulty relates.

Thus, identification of a research problem is the pre-condition to conducting research. A research problem is said to be the one which requires a researcher to find the best available solution to the given problem. That is, the researcher needs to find out the best course of action through which the research objective may be achieved optimally in the context of a given situation. Several factors may contribute

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to making the problem complicated. For example, the environment may alter, thus affecting the efficiencies of the alternative courses of action taken or the quality of the outcomes. The number of alternative courses of action might be very large and the individual not involved in making the decision may be affected by the change in environment and may react to it favorably or unfavorably. Other similar factors are also likely to cause such changes in the context of research, all of which may be considered from the point of view of a research problem.

1.10 Research Design

The most important step after defining the research problem is preparing the design of the research project, which is popularly known as the 'research design'. A research design helps to decide upon issues like what, when, where, how much, by what means etc. With regard to an enquiry or a research study. A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. Infact, research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data (Selltiz et al, 1962). Thus, research design provides an outline of what the researcher is going to do in terms of framing the hypothesis, its operational implications and the final data analysis.

Specifically, the research design highlights decisions which include:

1. The nature of the study
2. The purpose of the study
3. The location where the study would be conducted
4. The nature of data required
5. From where the required data can be collected
6. What time period the study would cover
7. The type of sample design that would be used
8. The techniques of data collection that would be used
9. The methods of data analysis that would be adopted and
10. The manner in which the report would be prepared

Features Of Research Design:

- i. The important features of Research Design may be outlined as follows:
It constitutes a plan that identifies the types and sources of information required for the research problem;
- ii. It constitutes a strategy that specifies the methods of data collection and analysis which would be adopted; and
- iii. It also specifies the time period of research and monetary budget involved in conducting the study, which comprise the two major constraints of undertaking any research

1.11 Concepts Relating To Research Design

Some of the important concepts relating to Research Design are discussed below:

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Dependent And Independent Variables:

A magnitude that varies is known as a variable. The concept may assume different quantitative values like height, weight, income etc. Qualitative variables are not quantifiable in the strictest sense of the term. However, the qualitative phenomena may also be quantified in terms of the presence or absence of the attribute(s) considered. The phenomena that assume different values quantitatively even in decimal points are known as 'continuous variables'. But all variables need not be continuous. Values that can be expressed only in integer values are called 'non-continuous variables'. In statistical terms, they are also known as 'discrete variables'. For example, age is a continuous variable, whereas the number of children is a non-continuous variable. When changes in one variable depend upon the changes in other variable or variables, it is known as a dependent or endogenous variable, and the variables that cause the changes in the dependent variable are known as the independent or explanatory or exogenous variables. For example, if demand depends upon price, then demand is a dependent variable, while price is the independent variable. And, if more variables determine demand, like income and price of the substitute commodity, then demand also depends upon them in addition to the price of original commodity. In other words, demand is a dependent variable which is determined by the independent variables like price of the original commodity, income and price of substitutes.

2. Extraneous Variables:

The independent variables which are not directly related to the purpose of the study but affect the dependent variables, are known as extraneous variables. For instance, assume that a researcher wants to test the hypothesis that there is a relationship between children's school performance and their self-confidence, in which case the latter is an independent variable and the former, a dependent variable. In this context, intelligence may also influence the school performance. However, since it is not directly related to the purpose of the study undertaken by the researcher, it would be known as an extraneous variable. The influence caused by the extraneous variable(s) on the dependent variable is technically called the 'experimental error'. Therefore, a research study should always be framed in such a manner that the influence of extraneous variables on the dependent variable/s is completely controlled, and the influence of independent variable/s is clearly evident.

3. Control:

One of the most important features of a good research design is to minimize the effect of extraneous variable(s). Technically, the term 'control' is used when a researcher designs the study in such a manner that it minimizes the effects of extraneous variables. The term 'control' is used in experimental research to reflect the restraint in experimental conditions.

4. Confounded Relationship:

The relationship between the dependent and independent variables is said to be confounded by an extraneous variable, when the dependent variable is not free from its effects.

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5. Research Hypothesis:

When a prediction or a hypothesized relationship is tested by adopting scientific methods, it is known as research hypothesis. The research hypothesis is a predictive statement which relates to a dependent variable and an independent variable. Generally, a research hypothesis must consist of at least one dependent variable and one independent variable. Whereas, the relationships that are assumed but not to be tested are predictive statements that are not to be objectively verified, thus are not classified as research hypotheses.

6. Experimental and Non-experimental Hypothesis Testing Research:

When the objective of a research is to test a research hypothesis, it is known as hypothesis-testing research. Such research may be in the nature of experimental design or non-experimental design. The research in which the independent variable is manipulated is known as 'experimental hypothesis-testing research', whereas the research in which the independent variable is not manipulated is termed as 'non-experimental hypothesis-testing research'. For example, assume that a researcher wants to examine whether family income influences the school attendance of a group of students, by calculating the coefficient of correlation between the two variables. Such an example is known as a non-experimental hypothesis-testing research, because the independent variable - family income is not manipulated here. Again assume that the researcher randomly selects 150 students from a group of students who pay their school fees regularly and then classifies them into two sub-groups by randomly including 75 in Group A, whose parents have regular earning, and 75 in Group B, whose parents do not have regular earning. Assume that at the end of the study, the researcher conducts a test on each group in order to examine the effects of regular earnings of the parents on the school attendance of the student. Such a study is an example of experimental hypothesis-testing research, because in this particular study the independent variable regular earnings of the parents have been manipulated.

7. Experimental And Control Groups:

When a group is exposed to usual conditions in an experimental hypothesis-testing research, it is known as 'control group'. On the other hand, when the group is exposed to certain new or special condition, it is known as an 'experimental group'. In the afore-mentioned example, Group A can be called as control group and Group B as experimental group. If both the groups, A and B are exposed to some special feature, then both the groups may be called as 'experimental groups'. A research design may include only the experimental group or both the experimental and control groups together.

8. Treatments:

Treatments refer to the different conditions to which the experimental and control groups are subject to.

1.12 Types Of Research Design

There are different types of research designs. They may be broadly categorized as:

1. Exploratory Research Design;
2. Descriptive and Diagnostic Research Design; and
3. Hypothesis-Testing Research Design.

Exploratory Research Design:

The Exploratory Research Design is known as formulative research design. The main objective of using such a research design is to formulate a research problem for an in-depth or more precise investigation, or for developing a working hypothesis from an operational aspect. The major purpose of such studies is the discovery of ideas and insights. Therefore, such a research design suitable for such a study should be flexible enough to provide opportunity for considering different dimensions of the problem under study. The in-built flexibility in research design is required as the initial research problem would be transformed into a more precise one in the exploratory study, which in turn may necessitate changes in the research procedure for collecting relevant data. Usually, the following three methods are considered in the context of a research design for such studies. They are (a) a survey of related literature; (b) experience survey; and (c) analysis of 'insight-stimulating' instances.

2. Descriptive And Diagnostic Research Design:

A Descriptive Research Design is concerned with describing the characteristics of a particular individual or a group. Meanwhile, a diagnostic research design determines the frequency with which a variable occurs or its relationship with another variable. In other words, the study analyzing whether a certain variable is associated with another comprises a diagnostic research study. On the other hand, a study that is concerned with specific predictions or with the narration of facts and characteristics related to an individual, group or situation, are instances of descriptive research studies. Generally, most of the social research design falls under this category. As a research design, both the descriptive and diagnostic studies share common requirements, hence they are grouped together. However, the procedure to be used and the research design need to be planned carefully. The research design must also make appropriate provision for protection against bias and thus maximize reliability, with due regard to the completion of the research study in an economical manner. The research design in such studies should be rigid and not flexible.

Besides, it must also focus attention on the following:

- a. Formulation of the objectives of the study,
- b. Proper designing of the methods of data collection,
- c. Sample selection,
- d. Data collection,
- e. Processing and analysis of the collected data, and
- f. Reporting the findings.

3. Hypothesis-Testing Research Design:

Hypothesis-Testing Research Designs are those in which the researcher tests the hypothesis of causal relationship between two or more variables. These studies require procedures that would not only decrease bias and enhance reliability, but also facilitate deriving inferences about the causality. Generally, experiments satisfy such requirements. Hence, when research design is discussed in such studies, it often refers to the design of experiments.

1.13 Importance and Characteristics of Research Design

Importance Of Research Design

The need for a research design arises out of the fact that it facilitates the smooth conduct of the various stages of research. It contributes to making research as efficient as possible, thus yielding the maximum information with minimum effort, time and expenditure. A research design helps to plan in advance, the methods to be employed for collecting the relevant data and the techniques to be adopted for their analysis. This would help in pursuing the objectives of the research in the best possible manner, provided the available staff, time and money are given. Hence, the research design should be prepared with utmost care, so as to avoid any error that may disturb the entire project.

Thus, research design plays a crucial role in attaining the reliability of the results obtained, which forms the strong foundation of the entire process of the research work.

Despite its significance, the purpose of a well-planned design is not realized at times. This is because it is not given the importance that it deserves. As a consequence, many researchers are not able to achieve the purpose for which the research designs are formulated, due to which they end up arriving at misleading conclusions. Therefore, faulty designing of the research project tends to render the research exercise meaningless. This makes it imperative that an efficient and suitable research design must be planned before commencing the process of research. The research design helps the researcher to organize his/her ideas in a proper form, which in turn facilitates him/her to identify the inadequacies and faults in them. The research design is also discussed with other experts for their comments and critical evaluation, without which it would be difficult for any critic to provide a comprehensive review and comments on the proposed study.

1.14 Characteristics Of A Good Research Design

A good research design often possesses the qualities of being flexible, suitable, efficient, economical and so on. Generally, a research design which minimizes bias and maximizes the reliability of the data collected and analysed is considered a good design (Kothari 1988). A research design which does not allow even the smallest experimental error is said to be the best design for investigation. Further, a research design that yields maximum information and provides an opportunity of viewing the various dimensions of a research problem is considered to be the most appropriate and efficient design. Thus, the question of a good design relates to the purpose or objective and nature of the research

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problem studied. While a research design may be good, it may not be equally suitable to all studies. In other words, it may be lacking in one aspect or the other in the case of some other research problems. Therefore, no single research design can be applied to all types of research problems.

A research design suitable for a specific research problem would usually involve the following considerations:

1. The methods of gathering the information;
2. The skills and availability of the researcher and his/her staff, if any;
3. The objectives of the research problem being studied;
4. The nature of the research problem being studied; and
5. The available monetary support and duration of time for the research work.

1.15 Case Study Research

The method of exploring and analyzing the life or functioning of a social or economic unit, such as a person, a family, a community, an institution, a firm or an industry is called case study method. The objective of case study method is to examine the factors that cause the behavioural patterns of a given unit and its relationship with the environment. The data for a study are always gathered with the purpose of tracing the natural history of a social or economic unit, and its relationship with the social or economic factors, besides the forces involved in its environment. Thus, a researcher conducting a study using the case study method attempts to understand the complexity of factors that are operative within a social or economic unit as an integrated totality. Burgess (Kothari, 1988) described the special significance of the case study in understanding the complex behaviour and situations in specific detail. In the context of social research, he called such data as social microscope.

1.16 Hypothesis

“Hypothesis may be defined as a proposition or a set of propositions set forth as an explanation for the occurrence of some specified group of phenomena either asserted merely as a provisional conjecture to guide some investigation in the light of established facts” (Kothari, 1988). A research hypothesis is quite often a predictive statement, which is capable of being tested using scientific methods that involve an independent and some dependent variables. For instance, the following statements may be considered:

1. “Students who take tuitions perform better than the others who do not receive tuitions” or,
2. “The female students perform as well as the male students”.

These two statements are hypotheses that can be objectively verified and tested. Thus, they indicate that a hypothesis states what one is looking for. Besides, it is a proposition that can be put to test in order to examine its validity.

1.17 Characteristics Of Hypothesis:

A hypothesis should have the following characteristic features:-

1. A hypothesis must be precise and clear. If it is not precise and clear, then the inferences drawn on its basis would not be reliable.
2. A hypothesis must be capable of being put to test. Quite often, the research programmes fail owing to its incapability of being subject to testing for validity. Therefore, some prior study may be conducted by the researcher in order to make a hypothesis testable. A hypothesis "is tested if other deductions can be made from it, which in turn can be confirmed or disproved by observation" (Kothari, 1988).
3. A hypothesis must state relationship between two variables, in the case of relational hypotheses.
4. A hypothesis must be specific and limited in scope. This is because a simpler hypothesis generally would be easier to test for the researcher. And therefore, he/she must formulate such hypotheses.
5. As far as possible, a hypothesis must be stated in the simplest language, so as to make it understood by all concerned. However, it should be noted that simplicity of a hypothesis is not related to its significance.
6. A hypothesis must be consistent and derived from the most known facts. In other words, it should be consistent with a substantial body of established facts. That is, it must be in the form of a statement which is most likely to occur.
7. A hypothesis must be amenable to testing within a stipulated or reasonable period of time. No matter how excellent a hypothesis, a researcher should not use it if it cannot be tested within a given period of time, as no one can afford to spend a life-time on collecting data to test it.
8. A hypothesis should state the facts that give rise to the necessity of looking for an explanation. This is to say that by using the hypothesis, and other known and accepted generalizations, a researcher must be able to derive the original problem condition. Therefore, a hypothesis should explain what it actually wants to explain, and for this it should also have an empirical reference.

Chapter-2 Data Collection Sources Of Data

2.1 Introduction

It is important for a researcher to know the sources of data which he requires for different purposes. Data are nothing but the information. There are two sources of information or data they are - Primary and Secondary data. The data are named after the source. Primary data refers to the data collected for

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the first time, whereas secondary data refers to the data that have already been collected and used earlier by somebody or some agency. For example, the statistics collected by the Government of India relating to the population is primary data for the Government of India since it has been collected for the first time. Later when the same data are used by a researcher for his study of a particular problem, then the same data become the secondary data for the researcher. Both the sources of information have their merits and demerits. The selection of a particular source depends upon the (a) purpose and scope of enquiry, availability of time, (c) availability of finance, (d) accuracy required, statistical tools to be used, (f) sources of information (data), and (g) method of data collection.

Purpose and Scope Of Enquiry:

The purpose and scope of data collection or survey should be clearly set out at the very beginning. It requires the clear statement of the problem indicating the type of information which is needed and the use for which it is needed. If for example, the researcher is interested in knowing the nature of price change over a period of time, it would be necessary to collect data of commodity prices. It must be decided whether it would be helpful to study wholesale or retail prices and the possible uses to which such information could be put. The objective of an enquiry may be either to collect specific information relating to a problem or adequate data to test a hypothesis. Failure to set out clearly the purpose of enquiry is bound to lead to confusion and waste of resources.

After the purpose of enquiry has been clearly defined, the next step is to decide about the scope of the enquiry. Scope of the enquiry means the coverage with regard to the type of information, the subject-matter and geographical area. For instance, an enquiry may relate to India as a whole or a state or an industrial town wherein a particular problem related to a particular industry can be studied.

Availability Of Time:

The investigation should be carried out within a reasonable period of time, failing which the information collected may become outdated, and would have no meaning at all. For instance, if a producer wants to know the expected demand for a product newly launched by him and the result of the enquiry that the demand would be meager takes two years to reach him, then the whole purpose of enquiry would become useless because by that time he would have already incurred a huge loss. Thus, in this respect the information is quickly required and hence the researcher has to choose the type of enquiry accordingly.

Availability Of Resources:

The investigation will greatly depend on the resources available like number of skilled personnel, the financial position etc. If the number of skilled personnel who will carry out the enquiry is quite sufficient and the availability of funds is not a problem, then enquiry can be conducted over a big area covering a good number of samples, otherwise a small sample size will do.

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The Degree Of Accuracy Desired:

Deciding the degree of accuracy required is a must for the investigator, because absolute accuracy in statistical work is seldom achieved. This is so because (i) statistics are based on estimates, (ii) tools of measurement are not always perfect and (iii) there may be unintentional bias on the part of the investigator, enumerator or informant. Therefore, a desire of 100% accuracy is bound to remain unfulfilled. Degree of accuracy desired primarily depends upon the object of enquiry. For example, when we buy gold, even a difference of 1/10th gram in its weight is significant, whereas the same will not be the case when we buy rice or wheat. However, the researcher must aim at attaining a higher degree of accuracy, otherwise the whole purpose of research would become meaningless.

Statistical Tools To Be Used:

A well defined and identifiable object or a group of objects with which the measurements or counts in any statistical investigation are associated is called a *statistical unit*. For example, in socio-economic survey the unit may be an individual, a family, a household or a block of locality. A very important step before the collection of data begins is to define clearly the statistical units on which the data are to be collected. In number of situations the units are conventionally fixed like the physical units of measurement, such as meters, kilometers, quintals, hours, days, weeks etc., which are well defined and do not need any elaboration or explanation.

However, in many statistical investigations, particularly relating to socioeconomic studies, arbitrary units are used which must be clearly defined. This is a must because in the absence of a clear cut and precise definition of the statistical units, serious errors in the data collection may be committed in the sense that we may collect irrelevant data on the items, which should have, in fact, been excluded and omit data on certain items which should have been included. This will ultimately lead to fallacious conclusions.

Sources Of Information (Data):

After deciding about the unit, a researcher has to decide about the source from which the information can be obtained or collected. For any statistical inquiry, the investigator may collect the data first hand or he may use the data from other published sources, such as publications of the government/semi-government organizations or journals and magazines etc.

Method of Data Collection:

There is no problem if secondary data are used for research. However, if primary data are to be collected, a decision has to be taken whether (i) census method or (ii) sampling technique is to be used for data collection. In census method, we go for total enumeration i.e., all the units of a universe have to be investigated. But in sampling technique, we inspect or study only a selected representative and adequate fraction of the population and after analyzing the results of the sample data we draw conclusions about the characteristics of the population. Selection of a particular technique becomes difficult because where population or census method is more scientific and 100% accuracy can be

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attained through this method, choosing this becomes difficult because it is time taking, it requires more labor and it is very expensive. Therefore, for a single researcher or for a small institution it proves to be unsuitable. On the other hand, sample method is less time taking, less laborious and less expensive but a 100% accuracy cannot be attained through this method because of sampling and non-sampling errors attached to this method. Hence, a researcher has to be very cautious and careful while choosing a particular method.

2.2 Methods of Collecting Primary Data - Data Collection & Sources Of Data

Methods of Collecting Primary Data:

Primary data may be obtained by applying any of the following methods:

1. Direct Personal Interviews.
2. Indirect Oral Interviews.
3. Information from Correspondents.
4. Mailed Questionnaire Methods.
5. Schedule Sent Through Enumerators.

2.3 Secondary Data - Data Collection & Sources Of Data

As stated earlier, secondary data are those data which have already been collected and analyzed by some earlier agency for its own use, and later the same data are used by a different agency. According to W.A. Neiswanger, "A primary source is a publication in which the data are published by the same authority which gathered and analyzed them. A secondary source is a publication, reporting the data which was gathered by other authorities and for which others are responsible."

Sources Of Secondary Data:

The various sources of secondary data can be divided into two broad categories:

1. Published sources, and
2. Unpublished sources.

Published Sources:

The governmental, international and local agencies publish statistical data, and chief among them are explained below:

- (a) International publications
- (b) Official Publications of Central and State Governments
- (c) Semi-Official Publications
- (d) Publications of Research Institutions

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(e) Publications of various Commercial and Financial Institutions

(f) Reports of various Committees and Commissions appointed by the

(g) Journals and News Papers:

Unpublished Sources:

Unpublished data can be obtained from many unpublished sources like records maintained by various government and private offices, the theses of the numerous research scholars in the universities or institutions etc.

Precautions In The Use Of Secondary Data:

Since secondary data have already been obtained, it is highly desirable that a proper scrutiny of such data is made before they are used by the investigator. In fact the user has to be extra-cautious while using secondary data. In this context Prof. Bowley rightly points out that "Secondary data should not be accepted at their face value." The reason being that data may be erroneous in many respects due to bias, inadequate size of the sample, substitution, errors of definition, arithmetical errors etc. Even if there is no error such data may not be suitable and adequate for the purpose of the enquiry. Prof. SimonKuznet's view in this regard is also of great importance. According to him, "the degree of reliability of secondary source is to be assessed from the source, the compiler and his capacity to produce correct statistics and the users also, for the most part, tend to accept a series particularly one issued by a government agency at its face value without enquiring its reliability".

Therefore, before using the secondary data the investigators should consider the following factors:

The Suitability Of Data:

The investigator must satisfy himself that the data available are suitable for the purpose of enquiry. It can be judged by the nature and scope of the present enquiry with the original enquiry. For example, if the object of the present enquiry is to study the trend in retail prices, and if the data provide only wholesale prices, such data are unsuitable.

(A) Adequacy Of Data:

If the data are suitable for the purpose of investigation then we must consider whether the data are useful or adequate for the present analysis. It can be studied by the geographical area covered by the original enquiry. The time for which data are available is very important element. In the above example, if our object is to study the retail price trend of india, and if the available data cover only the retail price trend in the state of bihar, then it would not serve the purpose.

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(b) Reliability Of Data:

The reliability of data is must. Without which there is no meaning in research. The reliability of data can be tested by finding out the agency that collected such data. If the agency has used proper methods in collection of data, statistics may be relied upon. It is not enough to have baskets of data in hand. In fact, data in a raw form are nothing but a handful of raw material waiting for proper processing so that they can become useful. Once data have been obtained from primary or secondary source, the next step in a statistical investigation is to edit the data i.e. To scrutinize the same. The chief objective of editing is to detect possible errors and irregularities. The task of editing is a highly specialized one and requires great care and attention. Negligence in this respect may render useless the findings of an otherwise valuable study. Editing data collected from internal records and published sources is relatively simple but the data collected from a survey need excessive editing.

While editing primary data, the following considerations should be borne in mind:

1. The data should be complete in every respect
2. The data should be accurate
3. The data should be consistent, and
4. The data should be homogeneous.

Data to possess the above mentioned characteristics have to undergo the same type of editing which is discussed below:

Editing for Completeness:

while editing, the editor should see that each schedule and questionnaire is complete in all respects. He should see to it that the answers to each and every question have been furnished. If some questions are not answered and if they are of vital importance, the informants should be contacted again either personally or through correspondence. Even after all the efforts it may happen that a few questions remain unanswered. In such questions, the editor should mark 'No answer' in the space provided for answers and if the questions are of vital importance then the schedule or questionnaire should be dropped.

(a) Editing for Consistency:

At the time of editing the data for consistency, the editor should see that the answers to questions are not contradictory in nature. If they are mutually contradictory answers, he should try to obtain the correct answers either by referring back the questionnaire or by contacting, wherever possible, the informant in person. For example, if amongst others, two questions in questionnaire are (a) Are you a student? (b) Which class do you study and the reply to the first question is 'no' and to the latter 'tenth' then there is contradiction and it should be clarified.

(b) Editing for Accuracy:

The reliability of conclusions depends basically on the correctness of information. If the information supplied is wrong, conclusions can never be valid. It is, therefore, necessary for the editor to see that the information is accurate in all respects. If the inaccuracy is due to arithmetical errors, it can be easily detected and corrected. But if the cause of inaccuracy is faulty information supplied, it may be difficult to verify it and an example of this kind is information relating to income, age etc.

(c) Editing For Homogeneity:

Homogeneity means the condition in which all the questions have been understood in the same sense. The editor must check all the questions for uniform interpretation. For example, as to the question of income, if some informants have given monthly income, others annual income and still others weekly income or even daily income, no comparison can be made. Therefore, it becomes an essential duty of the editor to check up that the information supplied by the various people is homogeneous and uniform.

2.4 Choice Between Primary and Secondary Data - Data Collection & Sources Of Data

Choice Between Primary and Secondary Data:

As we have already seen, there are a lot of differences in the methods of collecting Primary and Secondary data. Primary data which is to be collected originally involves an entire scheme of plan starting with the definitions of various terms used, units to be employed, type of enquiry to be conducted, extent of accuracy aimed at etc. For the collection of secondary data, a mere compilation of the existing data would be sufficient. A proper choice between the type of data needed for any particular statistical investigation is to be made after taking into consideration the nature, objective and scope of the enquiry; the time and the finances at the disposal of the agency; the degree of precision aimed at and the status of the agency (whether government- state or central-or private institution of an individual).

In using the secondary data, it is best to obtain the data from the primary source as far as possible. By doing so, we would at least save ourselves from the errors of transcription which might have inadvertently crept in the secondary source. Moreover, the primary source will also provide us with detailed discussion about the terminology used, statistical units employed, size of the sample and the technique of sampling (if sampling method was used), methods of data collection and analysis of results and we can ascertain ourselves if these would suit our purpose.

Now-a-days in a large number of statistical enquiries, secondary data are generally used because fairly reliable published data on a large number of diverse fields are now available in the publications of governments, private organizations and research institutions, agencies, periodicals and magazines etc. In fact, primary data are collected only if there do not exist any secondary data suited to the investigation under study. In some of the investigations both primary as well as secondary data may be used.

Chapter – 3 Questionnaire Sampling

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3.1 Introduction

Nowadays questionnaire is widely used for data collection in social research. It is a reasonably fair tool for gathering data from large, diverse, varied and scattered social groups. The questionnaire is the media of communication between the investigator and the respondents. According to Bogardus, a questionnaire is a list of questions sent to a number of persons for their answers and which obtains standardized results that can be tabulated and treated statistically.

The Dictionary of Statistical Terms defines it as a “group of or sequence of questions designed to elicit information upon a subject or sequence of subjects from information.” A questionnaire should be designed or drafted with utmost care and caution so that all the relevant and essential information for the enquiry may be collected without any difficulty, ambiguity and vagueness. Drafting of a good questionnaire is a highly specialized job and requires great care skill, wisdom, efficiency and experience. No hard and fast rule can be laid down for designing or framing a questionnaire. However, in this connection, the following general points may be borne in mind:

Size Of The Questionnaire Should Be Small:

A researcher should try his best to keep the number of questions as small as possible, keeping in view the nature, objectives and scope of the enquiry. Respondent's time should not be wasted by asking irrelevant and unimportant questions. A large number of questions would involve more work for the investigator and thus result in delay on his part in collecting and submitting the information. A large number of unnecessary questions may annoy the respondent and he may refuse to cooperate. A reasonable questionnaire should contain from 15 to 25 questions at large. If a still larger number of questions are a must in any enquiry, then the questionnaire should be divided into various sections or parts.

The Questions Should Be Clear:

The questions should be easy, brief, unambiguous, non-offending, courteous in tone, corroborative in nature and to the point, so that much scope of guessing is left on the part of the respondents.

The Questions Should Be Arranged In A Logical Sequence:

Logical arrangement of questions reduces lot of unnecessary work on the part of the researcher because it not only facilitates the tabulation work but also does not leave any chance for omissions or commissions. For example, to find if a person owns a television, the logical order of questions would be: Do you own a television? When did you buy it? What is its make? How much did it cost you? Is its performance satisfactory? Have you ever got it serviced?

Questions Should Be Simple To Understand:

The vague words like good, bad, efficient, sufficient, prosperity, rarely, frequently, reasonable, poor, rich etc., should not be used since these may be interpreted differently by different persons and as such

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might give unreliable and misleading information. Similarly the use of words having double meaning like price, assets, capital income etc., should also be avoided.

Questions Should Be Comprehensive & Easily Answerable:

Questions should be designed in such a way that they are readily comprehensible and easy to answer for the respondents. They should not be tedious nor should they tax the respondents' memory. At the same time questions involving mathematical calculations like percentages, ratios etc., should not be asked.

Questions Of Personal & Sensitive Nature Should Not Be Asked:

There are some questions which disturb the respondents and he/ she may be shy or irritated by hearing such questions. Therefore, every effort should be made to avoid such questions. For example, 'do you cook yourself or your wife cooks?' 'Or do you drink?' Such questions will certainly irk the respondents and thus be avoided at any cost. If unavoidable then highest amount of politeness should be used.

3.3 Sampling

Though sampling is not new, the sampling theory has been developed recently. People knew or not but they have been using the sampling technique in their day to day life. For example a house wife tests a small quantity of rice to see whether it has been well-cooked and gives the generalized result about the whole rice boiling in the vessel. The result arrived at is most of the times 100% correct. In another example, when a doctor wants to examine the blood for any deficiency, takes only a few drops of blood of the patient and examines. The result arrived at is most of the times correct and represent the whole amount of blood available in the body of the patient. In all these cases, by inspecting a few, they simply believe that the samples give a correct idea about the population. Most of our decision are based on the examination of a few items only i.e. Sample studies. In the words of Croxton and Cowdon, "It may be too expensive or too time consuming to attempt either a complete or a nearly complete coverage in a statistical study. Further to arrive at valid conclusions, it may not be necessary to enumerate all or nearly all of a population. We may study a sample drawn from the large population and if that sample is adequately representative of the population, we should be able to arrive at valid conclusions."

According to Rosander, "The sample has many advantages over a census or complete enumeration. If carefully designed, the sample is not only considerably cheaper but may give results which are just accurate and sometimes more accurate than those of a census. Hence a carefully designed sample may actually be better than a poorly planned and executed census."

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Merits:

1. It saves time
2. It reduces cost
3. More reliable results can be obtained
4. It provides more detailed information
5. Sometimes only sampling method to depend upon
6. Administrative convenience
7. More scientific

Demerits

Illusory conclusion

Sample Not Representative

Lack Of Experts

Sometimes More Difficult Than Census Method

Personal Bias

Choice Of Sample Size

Conditions Of Complete Coverage

Essentials of sampling:

In order to reach a clear conclusion, the sampling should possess the following essentials:

1. It must be representative:

The sample selected should possess the similar characteristics of the original universe from which it has been drawn.

2. Homogeneity:

Selected samples from the universe should have similar nature and should not have any difference when compared with the universe.

3. Adequate samples:

In order to have a more reliable and representative result, a good number of items are to be included in the sample.

4. Optimization:

All efforts should be made to get maximum results both in terms of cost as well as efficiency. If the size of the sample is larger, there is better efficiency and at the same time the cost is more. A proper size of sample is maintained in order to have optimized results in terms of cost and efficiency.

Chapter – 4 Experiments and Observation

4.1 Experiment

The meaning of experiment lies in the process of examining the truth of a statistical hypothesis related to some research problem. For example, a researcher can conduct an experiment to examine the newly developed medicine. Experiment is of two types: absolute experiment and comparative experiment. When a researcher wants to determine the impact of a fertilizer on the yield of a crop it is a case of absolute experiment. On the other hand, if he wants to determine the impact of one fertilizer as compared to the impact of some other fertilizer, the experiment will then be called as a comparative experiment. Normally, a researcher conducts a comparative experiment when he talks of designs of experiments.

4.2 Observation

Observation is a method that employs vision as its main means of data collection. It implies the use of eyes rather than of ears and the voice. It is accurate watching and noting of phenomena as they occur with regard to the cause and effect or mutual relations. It is watching other persons' behavior as it actually happens without controlling it. For example, watching bonded labourer's life, or treatment of widows and their drudgery at home, provide graphic description of their social life and sufferings. Observation is also defined as "a planned methodical watching that involves constraints to improve accuracy".

4.3 CHARACTERISTICS OF OBSERVATION

Scientific observation differs from other methods of data collection specifically in four ways: (i) observation is always direct while other methods could be direct or indirect; (ii) field observation takes place in a natural setting; (iii) observation tends to be less structured; and (iv) it makes only the qualitative (and not the quantitative) study which aims at discovering subjects' experiences and how subjects make sense of them (phenomenology) or how subjects understand their life (interpretivism).

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Lofland (1955) has said that this method is more appropriate for studying lifestyles or sub-cultures, practices, episodes, encounters, relationships, groups, organizations, settlements and roles etc. Black and Champion (1976) have given the following characteristics of observation:

1. Behavior is observed in natural surroundings.
2. It enables understanding significant events affecting social relations of the participants.
3. It determines reality from the perspective of observed person himself.
4. It identifies regularities and recurrences in social life by comparing data in our study with that of other studies.

Besides, four other characteristics are:

1. Observation involves some control pertaining to the observation and to the means he uses to record data. However, such controls do not exist for the setting or the subject population.
2. It is focused on hypotheses-free inquiry.
3. It avoids manipulations in the independent variable i.e., one that is supposed to cause other variable(s) and is not caused by them.
4. Recording is not selective.

Since at times, observation technique is indistinguishable from experiment technique, it is necessary to distinguish the two.

4.4 Technique, Merits and Demerits of Observation

Observation involves few controls than the experiment technique.

1. The behaviour observed in observation is natural, whereas in experiment it is not always so.
2. The behavior observed in experiment is more molecular (of a smaller unit), while one in observation is molar.
3. In observation, fewer subjects are watched for long periods of time in more varied circumstances than in experiment.
4. Training required in observation study is directed more towards sensitizing the observer to the flow of events, whereas training in experiments serves to sharpen the judgment of the subject.
5. In observational study, the behavior observed is more diffused. Observational methods differ from one another along several variables or dimensions.

Merits:

1. We get original data
2. We get more accurate and reliable data.
3. Satisfactory information can be extracted by the investigator through indirect questions.
4. Data are homogeneous and comparable.
5. Additional information can be gathered.
6. Misinterpretation of questions can be avoided.

Demerits:

1. It is time consuming and costs more.

Chapter – 5 Structure And Components Of Research Reports

5.1 WHAT IS A REPORT?

A report is a written document on a particular topic, which conveys information and ideas and may also make recommendations. Reports often form the basis of crucial decision making. Inaccurate, incomplete and poorly written reports fail to achieve their purpose and reflect on the decision, which will ultimately be made. This will also be the case if the report is excessively long, jargonistic and/ or structureless. A good report can be written by keeping the following features in mind:

1. All points in the report should be clear to the intended reader.
2. The report should be concise with information kept to a necessary minimum and arranged logically under various headings and sub-headings.
3. All information should be correct and supported by evidence.
4. All relevant material should be included in a complete report.

5.2 Purpose of Research Report

1. Why am i writing this report? Do i want to inform/ explain/ persuade, or indeed all of these.
2. Who is going to read this report? Managers/ academicians/ researchers! What do they already know? What do they need to know? Do any of them have certain attitudes or prejudices?
3. What resources do we have? Do i have access to a computer? Do i have enough time? Can any of my colleagues help?

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4. Think about the content of your report – what am i going to put in it? What are my main themes?
How much should be the text, and how much should be the illustrations?

Framework Of A Report

The various frameworks can be used depending on the content of the report, but generally the same rules apply. Introduction, method, results and discussion with references or bibliography at the end, and an abstract at the beginning could form the framework.

5.3 Structure of a report

Structure your writing around the IMR&D framework and you will ensure a beginning, middle and end to your report.

I	Introduction	Why did i do this research?	(beginning)
M	Method	What did i do and how did i go about doing it?	(middle)
R	Results	What did i find?	(middle)
AND			

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D	Discussion	What does it all mean?	(end)
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What do I put in the beginning part?

TITLE PAGE	Title of project, Sub-title (where appropriate), Date, Author, Organization, Logo
BACKGROUND	History(if any) behind project
ACKNOWLEDGEMENT	Author thanks people and organization who helped during the project
SUMMARY(sometimes called abstract of the synopsis)	A condensed version of a report – outlines salient points, emphasizes main conclusions and (where appropriate) the main recommendations. N.B this is often difficult to write and it is suggested that you write it last.
LIST OF CONTENTS	An at- a – glance list that tells the reader what is in the report and what page number(s) to find it on.
LIST OF TABLES	As above, specifically for tables.
LIST OF APPENDICES	As above, specifically for appendices.
INTRODUCTION	Author sets the scene and states his/ her intentions.
AIMS AND OBJECTIVES	AIMS – general aims of the audit/ project, broad statement of intent. OBJECTIVES – specific things expected to do/ deliver(e.g. expected outcomes)

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What do I Put In the middle Part?

METHOD	Work steps; what was done – how, by whom, when?
RESULT/FINDINGS	Honest presentation of the findings, whether these were as expected or not. Give the facts, including any inconsistencies or difficulties encountered

What do I put in the end part?

DISCUSSION	Explanation of the results.(you might like to keep the SWOT analysis in mind and think about your project's strengths, weakness, opportunities and threats, as you write)
CONCLUSIONS	The author links the results/ findings with the points made in the introduction and strives to reach clear, simply stated and unbiased conclusions. Make sure they are fully supported by evidence and arguments of the main body of your audit/project.
RECOMMENDATIONS	The author states what specific actions should be taken, by whom and why. They must always be linked to the future and should always be realistic. Don't make them unless asked to.
REFERENCES	A section of a report, which provides full details of publications mentioned in the text, or from which extracts have been quoted.

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APPENDIX	The purpose of an appendix is to supplement the information contained in the main body of the report.
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5.4 PRACTICAL REPORTS VS. ACADEMIC REPORTS

Practical Reports:

In the practical world of business or government, a report conveys an information and (sometimes) recommendations from a researcher who has investigated a topic in detail. A report like this will usually be requested by people who need the information for a specific purpose and their request may be written in terms of reference or the brief. Whatever the report, it is important to look at the instruction for what is wanted. A report like this differs from an essay in that it is designed to provide information which will be acted on, rather than to be read by people interested in the ideas for their own sake. Because of this, it has a different structure and layout.

Academic Reports:

A report written for an academic course can be thought of as a simulation. We can imagine that someone wants the report for a practical purpose, although we are really writing the report as an academic exercise for assessment. Theoretical ideas will be more to the front in an academic report than in a practical one. Sometimes a report seems to serve academic and practical purposes. Students on placement with organizations often have to produce a report for the organization and for assessment on the course. Although the background work for both will be related, in practice, the report the student produces for academic assessment will be different from the report produced for the organization, because the needs of each are different.

Research Report: Preliminaries

It is not sensible to leave all your writing until the end. There is always the possibility that it will take much longer than you anticipate and you will not have enough time. There could also be pressure upon available word processors as other students try to complete their own reports. It is wise to begin writing up some aspects of your research as you go along. Remember that you do not have to write your report in the order it will be read. Often it is easiest to start with the method section. Leave the introduction and the abstract to last. The use of a word processor makes it very straightforward to modify and rearrange what you have written as your research progresses and your ideas change. The very process of writing will help your ideas to develop. Last but by no means least, ask someone to proofread your work.

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

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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.

5.5 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.

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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.

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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.

5.6 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.

5.7 Research objectives

The final part of clarifying your research project involves thinking in more detail about your research objectives. Research objectives should be closely related to the statement of the problem and summarize what you hope will be achieved by the study. For example, if the problem identified is low utilization of antenatal care services, the general objective of the study could be to identify the reasons for this low uptake, in order to find ways of improving it. Writing your research objectives clearly helps to:

Define the focus of your study Clearly identify variables to be measured, Indicate the various steps to be involved, Establish the limits of the study and Avoid collection of any data that is not strictly necessary.

Objectives can be general or specific. The general objective of your study states what you expect to achieve in general terms. Specific objectives break down the general objective into smaller, logically connected parts that systematically address the various aspects of the problem. Your specific objectives should specify exactly what you will do in each phase of your study, how, where, when and for what purpose.

How should your objectives be stated?

Your objectives should be stated using action verbs that are specific enough to be measured, for example: to compare, to calculate, to assess, to determine, to verify, to calculate, to describe, to explain, etc. Avoid the use of vague non-active verbs such as: to appreciate, to understand, to believe, to study, etc., because it is difficult to evaluate whether they have been achieved.

Case Study 13.3 General and specific objectives for a counselling project

A research study designed to assess the accessibility and acceptability of the Voluntary Counselling and Testing (VCT) Services for HIV infection in kebeleX had the following general and specific objectives:

General objective: To identify factors that affects the acceptability of VCT services and to assess community attitudes towards comprehensive care and support for people living with HIV/AIDS.

Specific objectives:

- ✓ To assess the knowledge, attitude and practice of the community towards HIV/AIDS and VCT services.
- ✓ To identify barriers and concerns related to VCT and its uptake.
- ✓ To assess the awareness and perception of the study community regarding comprehensive care and support for people living with HIV/AIDS

5.8 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.

5.9 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.

Chapter – 6 Types Of Reports and Characteristics Of Good Research Report

6.1 Types of reports

Reports may be categorized broadly as Technical Reports and General Reports based on the nature of methods, terms of reference and the extent of in-depth enquiry made etc. On the basis of usage pattern, the reports may also be classified as information oriented reports, decision oriented reports and research based reports. Further, reports may also differ based on the communication situation. For example, the reports may be in the form of Memo, which is appropriate for informal situations or for short periods. On the other hand, the projects that extend over a period of time, often call for project reports. Thus, there is no standard format of reports. The most important thing that helps in classifying the reports is the outline of its purpose and answers for the following questions:

1. What did you do?
2. Why did you choose the particular research method that you used?
3. What did you learn and what are the implications of what you learned?
4. If you are writing a recommendation report, what action are you recommending in response to what you learned?

Two types of report formats are described below:

- A. Technical Reports
- B. General Reports

6.1.1 Technical Report

A technical report mainly focuses on methods employed, assumptions made while conducting a study, detailed presentation of findings and drawing inferences and comparisons with earlier findings based on the type of data drawn from the empirical work.

An outline of a Technical Report mostly consists of the following:

Title and nature of the study:

Brief title and the nature of work sometimes followed by subtitle indicate more appropriately either the method or tools used. Description of objectives of the study, research design, operational terms, working hypothesis, type of analysis and data required should be present.

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Abstract of Findings:

A brief review of the main findings just can be made either in a paragraph or in one/two pages.

Review of current status:

A quick review of past observations and contradictions reported, applications observed and reported are reviewed based on the in-house resources or based on published observations.

Sampling and Methods employed

Specific methods used in the study and their limitations. In the case of experimental methods, the nature of subjects and control conditions are to be specified. In the case of sample studies, details of the sample design i.e., sample size, sample selection etc are given.

Data sources and experiment conducted

Sources of data, their characteristics and limitations should be specified. In the case of primary survey, the manner in which data has been collected should be described.

Analysis of data and tools used.

The analysis of data and presentation of findings of the study with supporting data in the form of tables and charts are to be narrated. This constitutes the major component of the research report.

Summary of findings

A detailed summary of findings of the study and major observations should be stated. Decision inputs if any, policy implications from the observations should be specified.

References

A brief list of studies conducted on similar lines, either preceding the present study or conducted under different experimental conditions is listed.

Technical appendices

These appendices include the design of experiments or questionnaires used in conducting the study, mathematical derivations, elaboration on particular techniques of analysis etc.

6.1.2 General Reports

General reports often relate popular policy issues mostly related to social issues. These reports are generally simple, less technical, good use of tables and charts. Most often they reflect the journalistic style. Example for this type of report is the “Best B-Schools Survey in Business Magazines”. The outline of these reports is as follows:

1. Major Findings and their Implications
2. Recommendations for Action

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3. Objectives of the Study
4. Method Employed for Collecting Data
5. Results

6.2 Essentials Of A Good Report

Good research report should satisfy some of the following basic characteristics:

STYLE

Reports should be easy to read and understand. The style of the writer should ensure that sentences are succinct and the language used is simple, to the point and avoiding excessive jargon.

LAYOUT

A good layout enables the reader to follow the report's intentions, and aids the communication process. Sections and paragraphs should be given headings and sub-headings. You may also consider a system of numbering or lettering to identify the relative importance of paragraphs and sub-paragraphs. Bullet points are an option for highlighting important points in your report.

ACCURACY

Make sure everything you write is factually accurate. If you would mislead or misinform, you will be doing a disservice not only to yourself but also to the readers, and your credibility will be destroyed. Remember to refer to any information you have used to support your work.

CLARITY

Take a break from writing. When you would come back to it, you'll have the degree of objectivity that you need. Use simple language to express your point of view.

READABILITY

Experts agree that the factors, which affect readability the most, are:

1. Attractive appearance
2. Non-technical subject matter
3. Clear and direct style
4. Short sentences
5. Short and familiar words

REVISION

When first draft of the report is completed, it should be put to one side atleast for 24 hours. The report should then be read as if with eyes of the intended reader. It should be checked for spelling and grammatical errors. Remember the spell and grammar check on your computer. Use it!

REINFORCEMENT

Reinforcement usually gets the message across. This old adage is well known and is used to good effect in all sorts of circumstances e.g., presentations - not just report writing.

1. TELL THEM WHAT YOU ARE GOING TO SAY: in the introduction and summary you set the scene for what follows in your report.

2. THEN SAY IT : you spell things out in results/findings

3. THEN TELL THEM WHAT YOU SAID: you remind your readers through the discussion what it was all about.

FEEDBACK MEETING

It is useful to circulate copies of your report prior to the feedback meeting. Meaningful discussion can then take place during the feedback meeting with recommendations for change more likely to be agreed upon which can then be included in your conclusion. The following questions should be asked at this stage to check whether the Report served the purpose:

1. Does the report have impact?
2. Do the summary /abstract do justice to the report?
3. Does the introduction encourage the reader to read more?
4. Is the content consistent with the purpose of the report?
5. Have the objectives been met?
6. Is the structure logical and clear?
7. Have the conclusions been clearly stated?
8. Are the recommendations based on the conclusions and expressed clearly and logically?

Chapter – 7 Format And Presentation of A Report

7.1 Common Elements Of A Report

A report may contain some or all of the following, please refer to your departmental guidelines.

MEMORANDUM OR COVERING LETTER

Memorandum or Covering Letter is a brief note stating the purpose or giving an explanation that is used when the report is sent to someone within the same organization.

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TITLE PAGE

It is addressed to the receiver of a report while giving an explanation for it, and is used when the report is for someone who does not belong to the same organization as the writer. It contains a descriptive heading or name. It may also contain author's name, position, company's name and so on.

EXECUTIVE SUMMARY

Executive summary summarizes the main contents and is usually of about 300-350 words.

TABLE OF CONTENTS

Table of Contents consists of a list of the main sections, indicating the page on which each section begins.

INTRODUCTION

Informs the reader of what the report is about—aim and purpose, significant issues, any relevant background information.

REVIEW OF LITERATURE

Presents critical analysis of the available research to build a base for the present study.

METHODOLOGY

Gives details about nature of the study, research design, sample, and tools used for data collection and analysis.

RESULTS

Presents findings of the study.

DISCUSSION

Describes the reasoning and research in detail.

CONCLUSION/S

Summarizes the main points made in the written work in the light of objectives. It often includes an overall answer to the problem/s addressed; or an overall statement synthesizing the strands of information dealt with.

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RECOMMENDATION/S OR IMPLICATIONS

Gives suggestions related to the issue(s) or problem(s) dealt with. It may highlight the applications of the findings under implications section.

REFERENCES

An alphabetical list of all sources referred in the report.

APPENDICES

Extra information of further details placed after the main body of the text.

7.2 FORMATS OF REPORTS

Before attempting to look into presentation dimensions of a Report, a quick look into standard format associated with a Research Report is examined hereunder. The format generally includes the steps one should follow while writing and finalizing their research report.

Generally different parts of a report include:

1. Cover Page / Title Page
2. Introductory Pages (Foreword, Preface, Acknowledgement, Table of Contents, List of Tables, List of Illustrations or Figures, Key Words / Abbreviations Used Etc.)
3. Contents of the Report (Which Generally Includes a Macro Setting, Research Problem, Methodology Used, Objectives of the Study, Review of Studies, Tools Used for Data Collection and Analysis, Empirical Results in One/Two Sections, Summary of Observations etc.)
4. References (Including Appendices, Glossary of Terms Used, Source Data, Derivations of Formulas for Models Used in the Analysis etc.)

Title Page

The Cover Page or Title Page of a Research Report should contain the following information:

1. Title of the Project / Subject
2. Who has conducted the study
3. For what purpose
4. Organization
5. Period of submission