

12. Research Design

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12.1 Introduction:

A research design is simply the framework or plan for a study that is used as a guide in collecting and analyzing the data. It is a blueprint that is followed in completing a study. Research design is the blue print for collection measurement and analysis of data. Actually, it is a map that is usually developed to guide the research. Thus, we can say that a research design is the arrangement of condition for collection and analysis of data in a manner that aims to generalize the findings of the sample on the population. When particular research area has been defined, research problem is defined, and the related literature in the area has been reviewed, the next step is to construct the research design. It is fundamental to the success of any scientific research. Research design means an overall framework or plan for the activities to be undertaken during the course of a research study.

It involves decisions regarding what, where, when, how much and by what means concerning a research study. It constitutes a blue print for the collection, measurement and analysis of data. It serves as a framework for the study, guiding the collection and analysis of data, research instrument to be utilized and the sampling plan to be followed.

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

According to Kinner and Taylor: "A research design is the basic plan which guides the data collection and analysis phase of the research project. It is the framework which specifies the type of information to be collected, the source of data and the data collection procedure."

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

12.2 Elements of Research Design:

- a. **Problem:** A problem is an interrogative sentence or statement that asks what relation exists between two or more variables. The answer is what is being sought in the research. Research design is based on the research problem.
- b. **Methodology:** It deals with a choice of research design methods of measurement and types of analysis. All of these must be congruent. They must fit together. Methodology should be appropriate to the research problem.
- c. **Data gathering:** To implement general plan of research, methods of data collection must be used. There is always mutual inter plan of the problem and method. Problems dictate methods to a considerable extent. It can use internal or external sources. The tools can be questionnaire, observation, interview, etc.
- d. **Report writing:** It involves preparation and presentation of the research report. A report is a presentation of the research findings directed to a specific audience to accomplish specific objective.

Purposes of Research Design:

Purpose of a Research Design: Research designs are used for the following purposes;

- a. **To minimize the expenditure:** Research design carries an important influence on the reliability of the results attained. It therefore provides a solid base for the whole research. This makes the research as effective as possible by providing maximum information with minimum spending of effort, money and time by preparing the advance plan of all about the research.
- b. **To facilitate the smooth scaling:** Research design is needed because it facilitates the smooth scaling of the various research operations, thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money.
- c. **To collect the relevant data and technique:** Research design stands for advance planning of the methods to be adopted for collecting the relevant data and the techniques to be used in their analysis, keeping in view the objective of the research and the availability of staff time and money. Poor preparation of research design upset the entire project.
- d. **To provide blue print for plans:** Research design is needed due to the fact that it allows for the smooth working of many research operations. It is like blue print which we need in advance to plan the methods to be adopted for collecting the relevant data and techniques to be used in its analysis for preparation of research project. Just as for better economical and attractive construction of a house need a blue print and a map of that, similarly we need a blue print or a design for the smooth flow of operation of research.
- e. **To provide an overview to other experts:** A research design provides an overview of all the research process and with the help of the design we can take the help and views of experts of that field. The design helps the investigator to organize his ideas, which helps to recognize and fix his faults.

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

To provide answer to research question: Research design is invented to enable the researcher to answer research questions as, objective, accurately and economically as possible.

To control variance: It enables the investigator to gather and analyze his data in certain ways, it is a control mechanism.

Characteristics of Good Research Design:

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

- a. **Objectivity:** It refers to the findings related to the method of data collection and scoring of the responses. The research design should permit the measuring instruments which are fairly objective in which every observer or judge scoring the performance must precisely give the same report. In other words, the objectivity of the procedure may be judged by the degree of agreement between the final scores assigned to different individuals by more than one independent observer. This ensures the objectivity of the collected data which shall be capable of analysis and interpretation.
- b. **Reliability:** It refers to consistency throughout a series of measurements. For example, if a respondent gives out a response to a particular item, he is expected to give the same response to that item even if he is asked repeatedly. If he is changing his response to the same item, the consistency will be lost. So, the researcher should frame the items in a questionnaire in such a way that it provides consistency or reliability.
- c. **Validity:** Any measuring device or instrument is said to be valid when it measures what it is expected to measure. For example, an intelligence test conducted for measuring the IQ should measure only the intelligence and nothing else and the questionnaire shall be framed accordingly.
- d. **Generalizability:** It means how best the data collected from the samples can be utilized for drawing certain generalizations applicable to a large group from which sample is drawn. Thus, a research design helps an investigator to generalize his findings provided he has taken due care in defining the population, selecting the sample, deriving appropriate statistical analysis etc. while preparing the research design. Thus, a good research design is one which is methodologically prepared and should ensure that generalization is possible. For ensuring the generalization we should confirm that our research problem has the following characteristics;
 - The problem is clearly formulated.
 - The population is clearly defined.
 - Most appropriate techniques of sample selection are used to form an appropriate sample.
 - Appropriate statistical analysis has been carried out.
 - The findings of the study are capable of generalizations.

- e. **Adequate Information:** The most important requirement of good research design is that it should provide adequate information so that the research problem can be analyzed on a wide perspective. An ideal design should take into account important factors like;
 - Identifying the exact research problem to be studied
 - The objective of the research
 - The process of obtaining information.
 - The availability of adequate and skilled manpower and
 - The availability of adequate financial resources for carrying research.
- f. **Other Features:** Some other important features of a good research design are flexibility, adaptability, efficiency, being economic and so on. A good research design should minimize bias and maximize reliability and generalization.

12.3 Types of Research Design:

A. Descriptive Research Design:

Descriptive research design is designed to describe something. It simply portrays an accurate profile of organizations, events, situation or any phenomena. It describes conditions or relationship that exists, opinion that are held, process that are going on, effects that are evidence or trends that are developing. It is the fact finding operation design to search for information. Investigators collect, classify and correlate data to describe that exists. But it does not answer why phenomena behave as they do. Descriptive research is appropriate in the following conditions:

- Portraying the characteristics of social or any phenomena and determining the frequency of occurrence.
- Determining the degree of to which variables are associated.

Purposes of Descriptive Research:

- a. To collect detailed factual information that describes existing phenomena.
- b. To identify problems or justify current conditions and practice.
- c. To make comparisons and evaluations.
- d. To determine what others are doing with similar problems or situations and benefit from their experience in making future plans and decisions.

B. Exploratory Research Design:

It is designed to explore ideas and insights in order to obtain a proper definition of problems at hand. It is appropriate for the early stage of decision making process. It is designed to obtain a preliminary investigation of the situation with a minimum expenditure of time and cost.

Purpose of Exploratory Research:

- a. To identify problems and opportunities.
- b. To develop a more precise formulation of a vaguely identified problems or opportunity.
- c. To gain perspective regarding the breadth of variables operating in a situations.

- d. To establish priorities regarding the potential significance of various problems or opportunities o to identify and formulate alternative courses of action.
- e. To gather information on the problems associated with doing conclusive research.
- f. To gain management and researchers perspective regarding the character of the problem situation.

C. Experimental Research Design:

It describes what will be when certain variables are carefully controlled or manipulated. The focus is on variable relationship. The purpose of experimental research is to investigate possible cause-and -effect relationship as well as to understand the nature of functional relationship between caused factors and affect to be predicted. An experimental design involves the specifications of:

- a. Treatments that are to be manipulated.
- b. Test units to be used.
- c. Dependent variables to be measured.
- d. Procedures for dealing with extraneous variables.

12.4 Research Problem:

The problems lie everywhere around us. They even lie at our door step and in our backyards. Human nature is so complicated, that a problem solved for one individual may still exist for another individual, a problem solved for one class/ school/teacher/ situation/ system/time etc., still remains a problem for another class/ school/ teacher/ situation/system/time or a problem solved for the time being may reappear with a lapse of time. We become habitual of living in the age of problems i.e., we are so much surrounded by the problem that we suffers from /"problem blindness". But in order to solve the problem or making research we need to delimit the problem.

Selection of problem is not the first step in research but identification of the problem is the first step in research. Selection of problem is governed by reflective thinking. It is wrong to think that identification of a problem means to select a topic of a research or statement of the problem. A topic or statement of the problem and research problem are not the synonyms, but they are inclusive. The problem concerns with the functioning of the broader area of field studied, whereas a topic or title or statement of the problem is the verbal statement of the problem. The topic is the definition of the problem which delimits or pin points the task of a researcher. It is the usual practice of the researcher that they select the topic of the study from different sources especially from research abstracts. They do not identify the problem, but a problem is made on the basis of the topic. It results that they have no active involvement in their research activities, whatever, they do, do mechanically.

Definitions of the Problem:

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

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

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

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

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

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

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

Identification of a Research Problem:

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

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

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

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

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

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

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

The Sources of the Problem:

- a. The classroom, school, home, community and other agencies of education are obvious sources.
- b. Social developments and technological changes are constantly bringing forth new problems and opportunities for research.
- c. Record of previous research such specialized sources as the encyclopedias of educational, research abstracts, research bulletins, research reports, journals of researches, dissertations and many similar publications are rich sources of research problems.

- d. Text book assignments, special assignments, reports and term papers will suggest additional areas of needed research.
- e. Discussions-Classroom discussions, seminars and exchange of ideas with faculty members and fellow scholars and students will suggest many stimulating problems to be solved, close professional relationships, academic discussions and constructive academic climate are especially advantageous opportunities.
- f. Questioning attitude: A questioning attitude towards prevailing practices and research oriented academic experience will effectively promote problem awareness.
- g. The most practical source of problem is to consult supervisor, experts of the field and most experienced persons of the field. They may suggest most significant problems of the area. He can discuss certain issues of the area to emerge a problem.

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

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

Kerlinger Has Identified Following Three Criteria of Good Problem Statements;

- a. A problem should be concerned with relation between two or more variables.
- b. It should be stated 'clearly and unambiguously in question form'.
- c. It should be amenable to empirical testing.

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

Objectives of Assumptions about the Problem:

- a. To make the research work feasible.
- b. To delimit the scope of the problem.
- c. To establish the proper frame of reference.

Aspects of Delimiting a Problem:

- A. Delimited to certain variables that should be mentioned clearly in the problem.
- B. Delimited to the area or level as primary level, secondary level, and college or university level.
- C. Delimited to size of sample, considering the time, energy and money.
- D. Delimited to the best method only.
- E. Delimited to the best available tool for measuring the variable.
- F. Delimited to the most appropriate techniques.
- G. Other delimitations particular to a problem.

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

Evaluation of the Problem:

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

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

- a. Is the Problem Researchable?
- b. Is the Problem New?
- c. Is the Problem Significant?
- d. Is the Problem Feasible for the Particular Researcher?

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

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

12.5 Research Proposal:

A research proposal is an argument for the proposed study. It is comparable to the blue print that the architect prepares before the bids are let and buildings commences. By definition, a proposal is a persuasive presentation for consideration for something. Proposals are made by individuals or organizations to individuals or organizations. They are usually written but they can be oral presentation or combination of both. The main purpose of research proposal is to explain and justify the proposed study to an audience. Many institutions require that proposal be submitted before any project is approved. This provides a basis for the evaluation of the project and gives the advisor a basis for assistance during the period of his direction. It also provides a systematic plan of procedure for the researcher to follow.

Topic Selection:

A research proposal is prepared on a given topic. A research topic is essentially the specific problem area which requires an investigation. However, topic selection is not an easier job. It demands for rigorous mental exercise. It takes of great deal of searching problem topic. In university students need to submit a topic in a proposal form to his thesis advisor.

Sources of Topic:

- a. A problem of the student's own interest based on his experience, judgment, etc.
- b. Articles in different publications such as newspaper, journals, magazine, etc.
- c. Library and other research studies.
- d. Text/ reference book.
- e. Advisor's suggestions.
- f. Visiting organizations and interacting with the authorities.

Guidelines for Topic Selection:

- a. The student should immediately begin to think about his topic selection.
- b. The size of the topic should not be too broad or too small.
- c. The topic chosen should not be too complex.
- d. Material and data on the topic should be available.
- e. Topic should be researchable.

12.6 Format of the Research Proposal:

- A. Title:** It is the broad heading of the research proposal. It should be clearly stated at the beginning. The title should represent the proposed study. It should be short and unnecessary term should be avoided.
- B. Background Information:** This part of proposal gives useful information of the study that introduce briefly about it. It includes:
 - Background of the problem.
 - Description of the topic in general and how the researcher developed in it.
 - Background information on the organization to be studied.
 - Relevance of the proposed study.
- C. Statement of The Problem:** This is often a declarative statement but may be in the question form. This attempts to focus on a stated goal that gives direction to the research process. It must be limited enough in scope to make definite conclusion possible. The major statement may be followed by minor statement. This part includes:
 - Statement of general problem which being investigated.
 - Statement of detailed problem such as different variables and their associations.

D. Significance of The Problem:

It is important that researcher point out how the solution to the problem or answer to the question can influence related theory or practice. I.e., the researcher must demonstrate why it is worth the time, effort and expenses required to carry out the proposed research.

Failure to include this step in the proposal may well leave the researcher with a problem without significance- a search for date of little ultimate value.

E. Definitions, Assumptions, Limitations and Delimitations:

- a. The researcher should define all unusual terms that could be misinterpreted. The variables to be considered should be defined in peripheral form.
- b. The researcher should clearly state the assumptions of the study. Assumptions are statements or what the researcher believe to be facts but cannot verify.
- c. The researcher works within some conditions called limitations. They are those conditions beyond the control of researcher that may be restriction on the conclusion of the study and their
- d. Applications to other situations. It includes constraint like time, money, data, source, etc. they must be clearly stated.
- e. The researcher should also state the boundaries of the study. They are called delimitations.

F. Theoretical Framework/ Review of Related Literature:

This part contains a summary of the writings of recognized authorities and of previous research. This is called literature review. It provides evidence that the researcher is familiar with what is already known and what is unknown and untested. Once effective research is based upon past knowledge, this step helps to eliminate the duplications of what has been done and provides useful hypothesis and suggestions for significant investigation. This part should contain the following:

- a. The variables considered relevant to the study should be identified.
- b. A clear explanation of relationship between those variables should be explained.
- c. The theorized relationship as visualized by researcher should be presented.

G. Statement of Hypothesis / Objective:

It is appropriate here to formulate hypothesis. They offer tentative answer to a question. It includes the followings:

- a. Statement of research hypothesis which the researcher will try to test.
- b. In the case of exploratory or descriptive studies, the specific objectives of the study should be presented.

The statement or hypothesis / objectives in advance or the data gathering process is necessary for an unbiased investigation.

H. Research Methods:

This section consists of three parts:

- **Subjects:** The subject section details the population of the study from which the researcher plans to select the sample. It defines sample size and sampling methods.
- **Procedures:** The procedures section outlines the research plan/design. It describes in detail what will be done, how it will be done, what data will be needed and what data gathering device will be used.
- **Data analysis:** This section describes the method of data analysis. It performs test of hypothesis. The statistical tools to be applied are to be mentioned.

I. Reference/Bibliography:

The published sources of information and literature consulted in the course of proposal preparation should be alphabetically listed.