

# **RESEARCH DESIGN**

## **Definition**

1. The research design is the **master plan** that specifies the methods and procedures for collecting and analyzing the needed information in a research study
2. Research design is a plan of how, when, and where data are to be collected and analysed.
3. Research design is the researcher's overall plan for answering the research questions or testing the research hypotheses.

## **ELEMENTS OF RESEARCH DESIGN**

- ❖ There major elements in a research design as follows

### **1. The Approach**

- ❖ It involves the description of the plan to investigate the phenomenon under study in a structured (quantitative) or unstructured (qualitative) manner or a combination of the two methods (quantitative-qualitative integrated approach).
- ❖ Therefore, the approach helps to decide about the presence or absence as well as manipulation and control over variables.
- ❖ In addition, it also helps to identify the presence or absence of and comparison between groups.

### **2. Population, Sample, and Sampling Technique**

- ❖ Research design also provides the researcher with directions about population, sample, and sampling technique that will be used for the research study.
- ❖ For example, in an ethnographic qualitative research design, a researcher gets the directive that the population will be a specific cultural group and the study will include a small sample selected through a nonprobability sampling technique.

### **3. The Time, Place, and Sources of Data Collection**

- ❖ Time (specifying days, months, and years of study), location (study setting), and the sources of the requisite data are the other important constituents essential to ensure effective planning to conduct a research study.

### **4. Tools and Methods of Data Collection**

- ❖ This element of research design involves the description of different tools and methods of data collection, for example, questionnaires, interviews, direct observation, or any other methods that suit the particular approach of the research as well as nature of the phenomenon under study.

### **5. Methods of Data Analysis**

- ❖ A research design must also include the description of the methods of data analysis – either quantitative or qualitative data analysis – that helps the researcher to collect the relevant data, which later can be analysed as per the research design plan.
- ❖ Without a formal plan of data analysis, a researcher may collect irrelevant data, which can later become difficult to analyse.

## **SELECTION OF RESEARCH DESIGN**

- ❖ The selection of a research design largely depends on the nature of the research problem, the resources available (cost, time, expertise of the researcher) accessibility of subjects, and research ethics.
- ❖ However, the main factors that affect the selection of research design are as follows.

### **Factors Affecting Selection of Research Design**

- ❖ The selection of research design may be influenced by several factors as follows:
- 1. **Nature of the research problem** – Based on the nature of research problem or phenomenon, researchers decide whether it should be investigated through an experimental, quasi-experimental, or nonexperimental approach
- 2. **Purpose of the Study** – Study may be conducted for the purpose of prediction, description, exploration, or correlation of the research variables. Therefore, the purpose of the research study helps the researcher to choose a suitable research design.
- 3. **Researcher's knowledge and experience**–
- 4. **Researcher's interest and motivation** – Motivated researchers always analyse most aspects of research design before selecting one or a combination, while casual and callous researchers may choose research designs that may lead to failure.
- 5. **Research ethics and principles** – The incorporation and application of ethical and legal principles in the research design are essential. This includes moral obligations, such as respect for participants and their rights, informed consent, and protection from harm, including ant-adverse effects to educational progress, health, and well-being.

## **VALIDITY OF RESEARCH DESIGNS**

- ❖ There are two important criteria for evaluating the credibility and dependability of the research results – *internal and external validity*

### **INTERNAL VALIDITY**

- ❖ It validates whether the independent variables actually made a difference. Did the intervention or treatment lead to the results, or were the results a response to the other factors (extraneous variables)?
- ❖ Internal validity is helpful in making the inference that the independent variable influences the dependent variable.

### **Threats to Internal Validity**

- ❖ The following are common threats to the internal validity
1. **History** – The threat of history occurs when some event beside the experimental treatment occurs during the course of study, and this event even influences dependent variables.
    - ❖ For example, you are conducting a health teaching programme on the importance of breast self-examination (BSE), while a famous actress was recently diagnosed with breast cancer.
    - ❖ This catches media attention resulting in a change in behaviour (about BSE). What would be your conclusion, your health education or the breast cancer diagnosis of the movie actress and the media attention.

2. **Maturation of subjects** – When experimental research is carried on for a long period of time over a group of subjects, there may be changes in the subjects in different ways, like in children there is increase in height, weight etc.
- ❖ For example, a researcher is interested in assessing the effect of a particular diet on the weight and height of malnourished children. If this experiment is conducted for a very long period, it is difficult to make out whether the effect on weight and height is due to maturation or the diet that was introduced.
3. **Testing** – It refers to the effect of taking a pretest of subjects' performance. The effect of taking a pretest may sensitize an individual and improve the score of the post test. Individuals generally score higher when they take test a second time regardless of the treatment.
4. **Instrumentation change**- This bias reflects changes in measuring instruments or methods of measurement between two points of data collection. Instruments like thermometer, sphygmomanometer, weighing scale, tape measure, etc. should be checked for their accuracy at regular intervals, and same instruments should be used throughout the study to minimize the instrument-related error of the internal validity.
5. **Mortality**- Mortality is the loss or dropout of study subjects during the course of the study. If the subjects who remain in the study or join later are not similar to those who dropped out, the results could be affected. The longer the period of study, the more are the chances of subject mortality.
6. **Selection bias** – If the subjects are not selected randomly for participation in groups, then there is a possibility that the groups that will be compared may not be equivalent. The effect on the dependent variable may be due to some other factors.

## **EXTERNAL VALIDITY**

- ❖ It refers to the extent to which the results can be generalized to a larger population.
- ❖ External validity looks into what conditions and in which type of subjects the same results can be expected to be replicated, or whether the same intervention will work in another setting and with different subjects.

## **Factors that May Affect External Validity**

1. **Hawthorne Effect**- Subjects may behave in a particular manner because they are aware of them being observed and this is called the Hawthorne effect. Subjects have knowledge that they are involved in research study, thus affecting the result
2. **Experimental effect** – Experimental effect is a threat to study when results when researcher's characteristics, mannerisms, or behaviour may influence subject behaviour. Examples of researcher's characteristics or behaviour are facial expressions, clothes, age, gender, body built, etc. Thus, the way the researcher dresses up or the researcher's gender can influence the way in which respondents answer the research questions.
3. **Reactive effect of pretest**- The reactive effect of pretest occurs when subjects have been sensitized to the treatment because of taking a pretest. People might not respond to the treatment in the manner they finally do if they had not received the pretest. For example, a researcher wants to conduct a study to assess the effect of a health education programme on the awareness of HIV / AIDS among people. In this instance, the researcher conducts a pretest

to collect baseline data before the health education. The pretest may sensitize the subjects to learn about the HIV/AIDS irrespective of whether the health education is provided or not to the subjects.

4. **Novelty effect** – When a treatment is new, subjects and researcher might behave in different ways. They may be enthusiastic about new methods of doing things. Once treatment is more familiar and as the novelty wears off, results might differ.
5. **People**- For example, people of a specific race, such as whites have a high prevalence of coronary artery disease compared to the blacks. Therefore, a generalization made for whites will not be applicable for blacks. Hence this is a threat to external validity.
6. **Place**- For example, people living at high altitudes have a higher haemoglobin (Hb) level because at higher altitudes the requirement of oxygen is more, due to which there is more production of red blood cells (RBCs). However, the Hb level of people living on the plains is lower in comparison; so, generalization for people of hilly areas is not applicable for people living on the plains
7. **Time**: If a research was carried out on a community in 1990 and then again in 2000, the results of these two researches would be different. Therefore, older results cannot be generalized over periods of time as societies and circumstances constantly change.

### **TYPES OF RESEARCH DESIGN** (Read on Them)

- ❖ Generally, research designs are classified into three broad categories and several sub types
  1. Quantitative research design
  2. Qualitative research design
  3. Mixed methods
- ❖ Quantitative research design is further divided into Experimental research designs and Nonexperimental research designs.
- ❖ ***Read on their Features, types advantages and disadvantages***