# Phase 3: Designing the research project.

* The research design is the blueprint for fulfilling objectives and answering questions. Selecting a design may be complicated by the availability of a large variety of methods, Techniques, Procedures, Protocols and sampling plans.
  + You may decide on a secondary data study, case study survey, experiment or simulation.
  + If a survey is selected, should it be administered by mail, telephone, Internet or personal interview?
  + Should all relevant data be collected at one time or at regular intervals?
  + What kind of structure will the questionnaire or interview guide possess?
  + Should the response be scaled or open ended?
  + How will reliability and validity be achieved?
  + Will characteristics of the interviewer influence response to the measurement questions?
  + What kind of training should the data collectors receive?
  + Is a sample or a census is to be taken? What type of sampling plans should be considered.

# Research design

A research design is based on the framework and provides a direction to the investigation being conducted in the most efficient manner.

Green et al. (2008) defines research design as a specification of method and procedures for acquiring the information needed. It is the overall operational pattern of framework of the project that stipulates what information is to be collected, from which source and by what procedures.

# Need of Research design

Research design is needed because it facilitates the smooth sailing of the various research operations, thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money.

Research design stands for advance planning of the methods to be adopted for collecting the relevant data and the techniques to be used in their analysis, keeping in view the objective of the research and the availability of staff, time and money. Preparation of the research design should be done with great care as any error in it may upset the entire project. Research design, in fact, has a great bearing on the reliability of the results arrived at and as such constitutes the firm foundation of the entire edifice of the research work.

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

# Features of a good design

* A good design is often characterised by adjectives like **flexible, appropriate, efficient, economical,** and so on.
* The design which minimises bias and maximises the reliability of the data collected and analysed is considered a good design.
* The design which gives the smallest experimental error is supposed to be the best design in many investigations.
* A design which yields maximal information and provides an opportunity for considering many different aspects of a problem is considered most appropriate and efficient design in respect of many research problems.

Thus, the question of good design is related to the purpose or objective of the research problem and with the nature of the problem to be studied. A design may be quite suitable in one case but may be found wanting in one respect or the other in the context of some other research problem. One single design cannot serve the purpose of all types of research problems.

If the research study happens to be an exploratory or a formulative one, wherein the major emphasis is on discovery of ideas and insights, the research design most appropriate must be flexible enough to permit the consideration of many different aspects of a phenomenon. But when the purpose of a study is accurate description of a situation or of an association between variables (or in what are called the descriptive studies), accuracy becomes a major consideration and a research design which minimises bias and maximises the reliability of the evidence collected is considered a good design.

Studies involving the testing of a hypothesis of a causal relationship between variables require a design which will permit inferences about causality in addition to the minimisation of bias and maximisation of reliability. But in practice it is the most difficult task to put a particular study in a particular group, for a given research may have in it elements of two or more of the functions of different studies. It is only on the basis of its primary function that a study can be categorised either as an exploratory or descriptive or hypothesis-testing study and accordingly the choice of a research design may be made in case of a particular study.

Besides, the availability of time, money, skills of the research staff and the means of obtaining the information must be given due weightage while working out the relevant details of the research design such as experimental design, survey design, sample design and the like.

# Concepts related to research design:

## Dependent and independent variable

A concept which can take on different quantitative values is called a variable. As such the concepts like weight, height, income are all examples of variables. If one variable depends upon or is a consequence of the other variable, it is termed as a dependent variable, and the variable that is antecedent to the dependent variable it is termed as an independent variable. For instance, if we say that height depends upon age, then height is a dependent variable and age is an independent variable. Further, if in addition to being dependent upon age, height also depends upon the individual’s food habits, then height is a dependent variable and age and food habits are independent variables.

## Extraneous Variable

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

## Control

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

## Research Hypothesis

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