

SOS POLITICAL SCIENCE AND PUBLIC ADMINISTRATION

MBA HRD 203

SUBJECT NAME: RESEARCH METHODOLOGY

TOPIC NAME: RESEARCH DESIGN

RESEARCH DESIGN



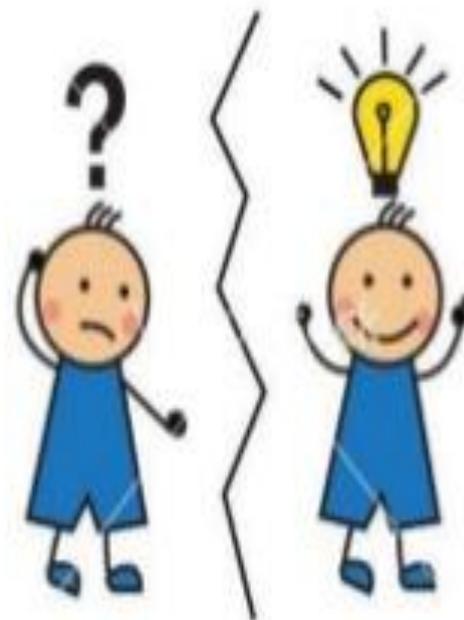


Research Design

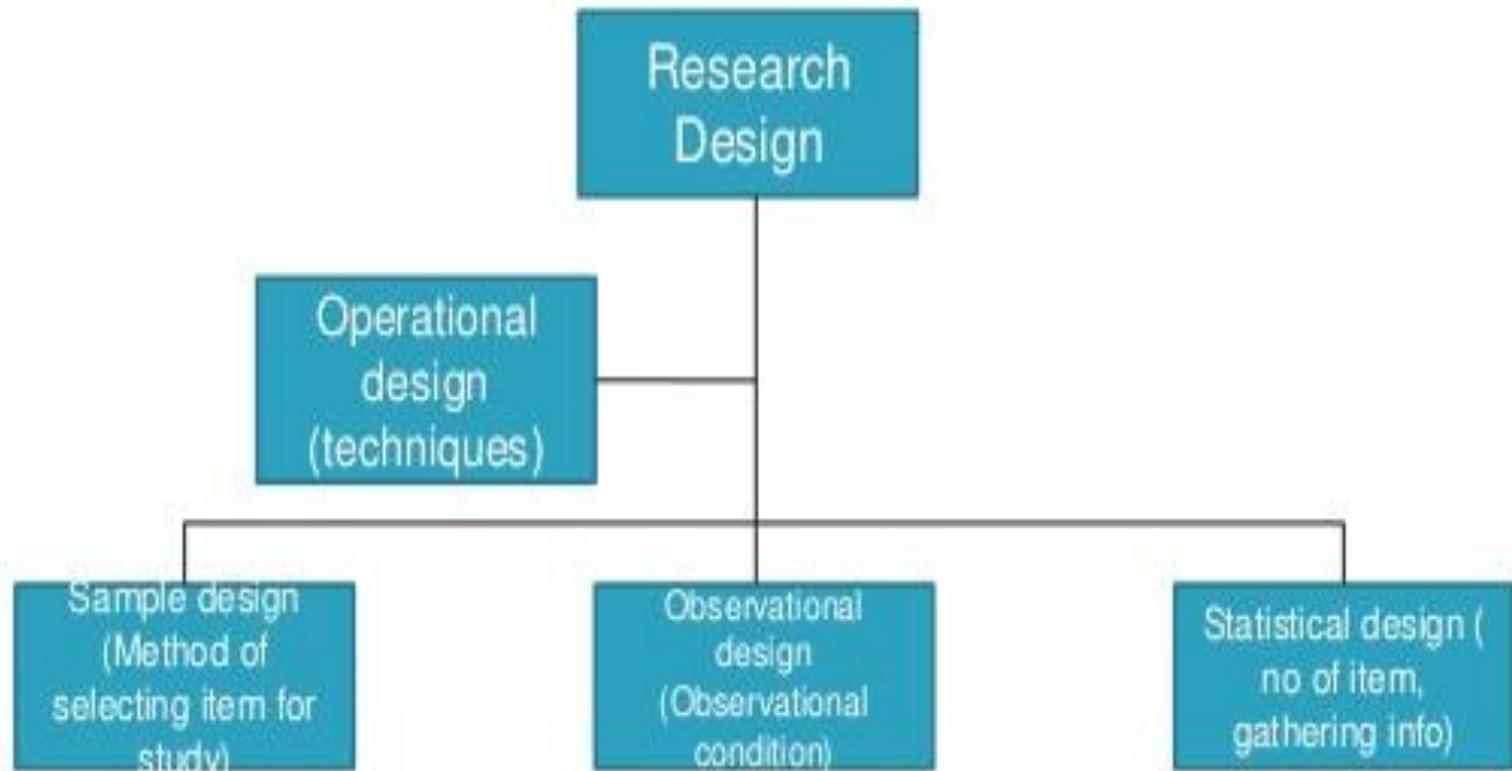
- ❑ Decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design.
- ❑ The research design is the master plan specifying the methods and procedures for collecting and analyzing the needed information.
- ❑ Design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data

Research design should answer

- (i) What is the study about?
- (ii) Why is the study being made?
- (iii) Where will the study be carried out?
- (iv) What type of data is required?
- (v) Where can the required data be found?
- (vi) What periods of time will the study include?
- (vii) What will be the sample design?
- (viii) What techniques of data collection will be used?
- (ix) How will the data be analyzed?
- (x) In what style will the report be prepared?



Research Design (by considering all previous questions)



Research Design

- Sample design: this deals with the technique of selecting items and thus requires careful observation for the given research study.
- Observational design: this relates to the conditions under which the experiments are to be conducted.
- Statistical design: this concerns the question of how many items are to be observed, and how are the collected data and information going to be analyzed.
- Operational design: this deals with the methods by which the procedures specified in the sample, observational and statistical designs can be

Need of Research Design

- It facilitates smooth sailing of various research operation.
- It makes research efficient as possible yielding, maximum information with minimal expenditure of effort ,time and money.
 - Eg . In house building ,we require map or design of house. Similarly we require research design for data collection and analysis of data of our research project

Features of Good Research Design

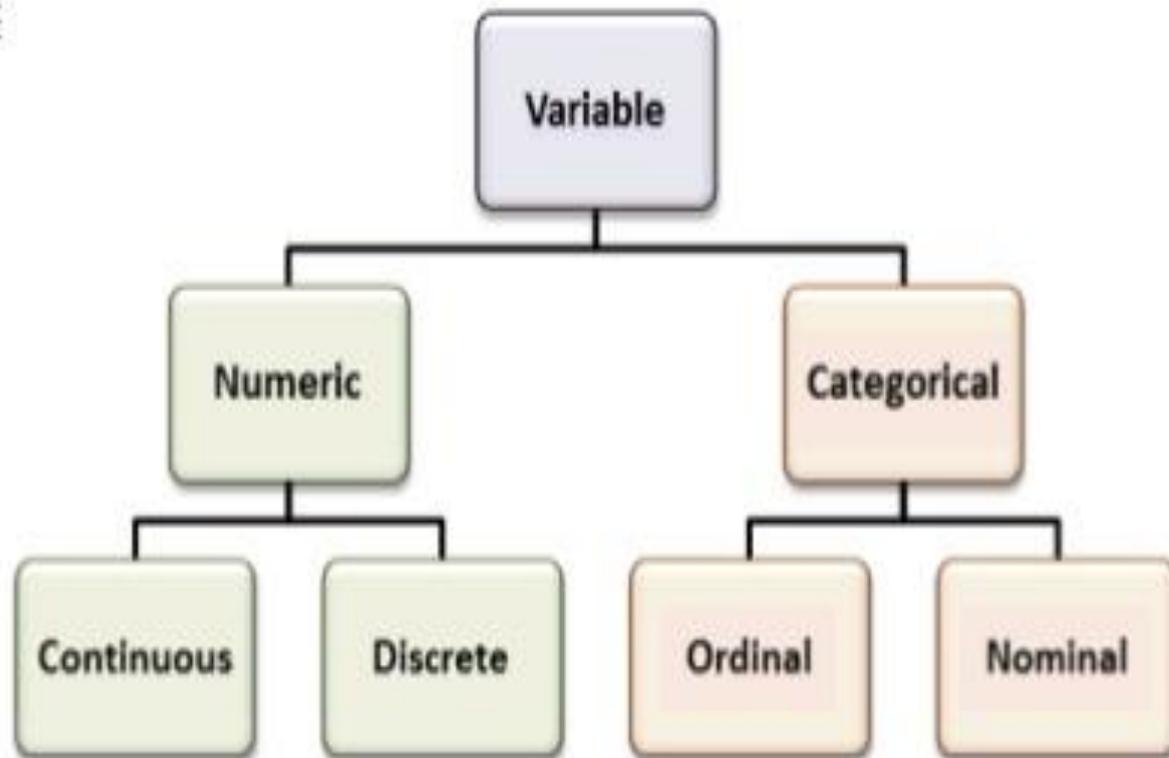
- Design which should
 - Minimize bias
 - Maximizes reliability of data collected
 - Maximize the reliability of data analyzed
 - Minimum experimental error (human error, mistakes in data entry, mistakes in design of experiment and random error)

Research design must, at least, contain

- (a) a clear statement of the **research problem**;
- (b) **procedures and techniques** to be used for gathering information;
- (c) the **population** to be studied;
- (d) **methods** to be used in processing and analyzing data

Some concepts relating to design

- Variable : **A variable is any characteristics, number, or quantity that can be measured or counted. Ex: Age, sex, business**

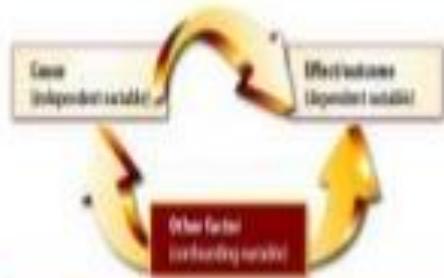


Quantitative variable

- **Numeric variables** have values that describe a measurable quantity as a number, like 'how many' or 'how much'. Therefore numeric variables are quantitative variables.
 - A **continuous variable** is a numeric variable. Observations can take any value between a certain set of real numbers. Ex: time, height, temperature etc.
 - A **discrete variable** is a numeric variable. Observations can take a value based on a count from a set of distinct whole values. Ex : number of children's in family, number of students in class etc

Qualitative Variable

- **Categorical variables** have values that describe a 'quality' or 'characteristic' of a data unit, like 'what type' or 'which category'. Therefore, categorical variables are qualitative variables.
 - ┆ An **ordinal variable** is a categorical variable. Observations can take a value that can be logically ordered or ranked. Ex : academic grades (i.e. A, B, C), clothing size (i.e. small, medium, large, extra large) .
 - ┆ A **nominal variable** is a categorical variable. Observations can take a value that is not able to be organized in a logical sequence. Ex: sex, eye color, religion.



Extraneous variable

- Extraneous Variables are undesirable variables that influence the relationship between the variables that an experimenter is examining.
 - └ For example : if you want to measure the relationship between student working hours and exam performances. Student intelligence play as a one of the extraneous variable in this study.
- Whatever effect is noticed on dependent variable as a result of extraneous variable(s) is technically described as an '**experimental error**'.

Control and Confounded

- **Control:** One important characteristic of a good research design is to minimize the influence or effect of extraneous variable(s).
- **Confounded relationship:** When the dependent variable is not free from the influence of extraneous variable(s), the relationship between the dependent and independent variables is said to be confounded by an extraneous variable(s).

Different Research Design

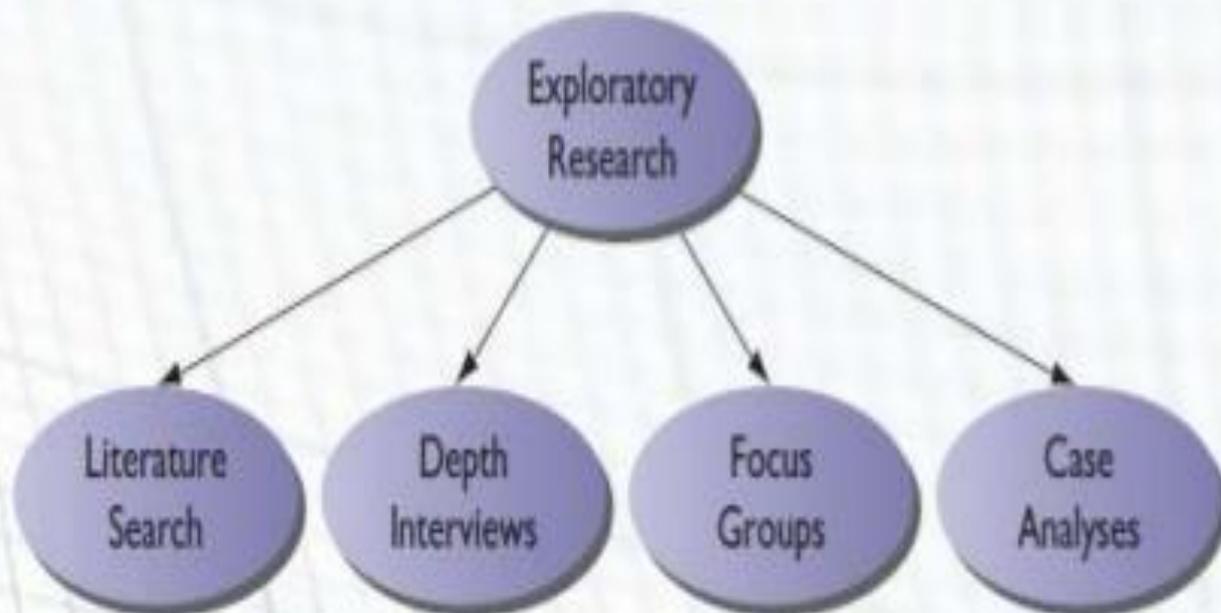
- The research design can be classified based on study of research.
 - Research design in case of exploratory research studies
 - Research design in case of descriptive and diagnostic research studies
 - Research design in case of hypothesis-testing research studies.

Research design in case of exploratory research studies

- Exploratory research is conducted to provide a better understanding of a situation.
- It isn't designed to come up with final answers or decisions. Through exploratory research, researchers hope to produce hypotheses about what is going on in a situation.
 - For example, if some crime happened, what is the first step police do? (to search for clues that can help establish what has happened) i.e exploratory research
 - For example, if sales for a particular line of vehicles dropped during the latest quarter, as a researcher you might use exploratory research to provide insights about what caused the decrease in revenue

- 
- Suppose that you conducted interviews with potential car buyers and noticed that they seemed to be more excited about the new styles of other car brands than they were about the brand in question.
 - This might lead to the hypothesis that style preferences had changed, resulting in lower sales. You can't really confirm or reject the hypothesis with exploratory research, though.
 - it's helps to define the problem.
 - It is very flexible with regards to methods used for gaining insights and to develop hypothesis.

Common Types of Exploratory Research



- Literature search: A search of popular press (newspapers, magazines, etc.), trade literature, academic literature, or published statistics from research firms or governmental agencies for data or insight into the problem at hand.
- Depth interviews : Interviews with people knowledgeable about the general subject being investigated.
- Focus group: An interview conducted among a small number of individuals simultaneously; the interview relies more on group discussion than on directed questions to generate data.
- case analysis : Intensive study of selected examples of the phenomenon of interest.

Descriptive Research Design

- We use descriptive research for following purpose:
 - To describe the characteristics of certain groups.
 - To determine the proportion of people who behave in a certain way.
 - To make specific predictions.
 - To determine relationships between variables

Descriptive Studies

Longitudinal

Continuous Panel

Discontinuous Panel

Cross-Sectional

Sample Survey

- **Cross sectional study:** Investigation involving a sample of elements selected from the population of interest that are measured at a single point in time.
- **Longitudinal study:** Investigation involving a fixed sample of elements that is measured repeatedly through time.
- **Continuous panel :** A fixed sample of respondents who are measured repeatedly over time with respect to the same variables.
- **Discontinuous panel:** A fixed sample of respondents who are measured repeatedly over time, but on variables that change from measurement to measurement.
- **Sample survey:** Cross-sectional study in which the sample is selected to be representative of the target population and in which the emphasis is on the generation of summary statistics such as averages and percentages.

<i>Research Design</i>	<i>Type of study</i>	
	<i>Exploratory or Formulative</i>	<i>Descriptive/Diagnostic</i>
Overall design	Flexible design (design must provide opportunity for considering different aspects of the problem)	Rigid design (design must make enough provision for protection against bias and must maximise reliability)
(i) Sampling design	Non-probability sampling design (purposive or judgement sampling)	Probability sampling design (random sampling)
(ii) Statistical design	No pre-planned design for analysis	Pre-planned design for analysis
(iii) Observational design	Unstructured instruments for collection of data	Structured or well thought out instruments for collection of data
(iv) Operational design	No fixed decisions about the operational procedures	Advanced decisions about operational procedures.

hypothesis-testing research studies

- Hypothesis-testing research studies are known as experimental studies
 - tests the hypotheses of causal relationships between variables.
 - It will permit drawing inference about causality.
- Usually experiments meet this requirement

- Three basic principles of experimental designs
 - (1) the Principle of Replication;
 - (2) the Principle of Randomization;
 - (3) Principle of Local Control.

Principle of Replication

- The Principle of Replication: the experiment should be repeated more than once
- The statistical accuracy of the experiments is increased.
 - Suppose we are to examine the effect of two varieties of rice. For this purpose we may divide the field into two parts and grow one variety in one part and the other variety in the other part. We can then compare the yield of the two parts and draw conclusion on that basis. But if we are to apply the principle of replication to this experiment, then we first divide the field into several parts, grow one variety in half of these parts and the other variety in the remaining parts. We can then collect the data of yield of the two varieties and draw conclusion by comparing the same.

Principle of Randomization

- The *Principle of Randomization* provides protection, when we conduct an experiment, against the effect of extraneous factors by randomization.

For instance, if we grow one variety of rice, say, in the first half of the parts of a field and the other variety is grown in the other half, then it is just possible that the soil fertility may be different in the first half in comparison to the other half. If this is so, our results would not be realistic.

In such a situation, we may assign the variety of rice to be grown in different parts of the field on the basis of some random sampling technique i.e., we may apply randomization principle and protect ourselves against the effects of the extraneous factors.

- The principle of randomization, have a better estimate of the experimental error.

Principle of Local Control

- Principle of Local Control: Under it the extraneous factor, the known source of variability, is made to vary deliberately over as wide a range as necessary and this needs to be done in such a way that the variability it causes can be measured and hence eliminated from the experimental error.
 - ┆ we first divide the field into several homogeneous parts, known as blocks, and then each such block is divided into parts equal to the number of treatments. Then the treatments are randomly assigned to these parts of a block. Dividing the field into several homogenous parts is known as 'blocking'. In general, blocks are the levels at which we hold an extraneous factor fixed, so that we can measure its contribution to the total variability of the data

THANK
YOU

