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# RESEARCH DES

Module -2



## Course objective

- To study the various research designs
- To apply to carry out the real life situational
- To understand the various methods of data collection and analyse



## Meaning

- A research design is a “Blue Print” for collect analysis of data.
- It outlines how the research will be carried o sticks together the entire process of research
- It provides answers to various questions like
  - What techniques will be used to gather data.
  - What kind of sampling will be used? How time a with? Etc.



# Categories of Research Design

- Exploratory Design
- Conclusive Research Design
  - Descriptive
  - Causal
- Experimental Design

The choice of the most appropriate design depends on the research and how much is known about the objectives.

The overall research design for a project may include three designs as part



## **Basic Research Objectives and Research Design**

### **Research Objective**

To gain background information, to define terms, to clarify problems and develop hypotheses, to establish research priorities, to develop questions to be answered

To describe and measure phenomena at a point  
In time

To determine causality, test hypotheses, to make “if-then”  
Statements, to answer questions



## **Exploratory Research**

- Exploratory research is most commonly used as preliminary research that is undertaken to gain background information on the general nature of the research problem.
- Exploratory research is usually conducted when the researcher does not know much about the problem and needs preliminary information or desires new or more recent information.



## **Exploratory Research**

- Exploratory research helps diagnose the direction so that successive research will be on target
- It helps to set priorities for research. Exploratory research is conducted in a number of situations:
- Eg :

Evaluation of quality of service of bank/

# Exploratory Research

- Exploratory research is used in a number of
  - 1. Identify the problems or opportunities
  - 2. Defining the problem more precisely
  - 3. Establishing priorities regarding the potential problems or opportunities
  - 4. To identify course of action i.e. most likely a



# Exploratory Research

A variety of methods are available to conduct exploratory

- Secondary Data Analysis →
- Experience Surveys
- Case Analysis
- Focus Groups
- Projective Techniques

Trade journals, I

Eg: growth of in  
sales?

# Exploratory Research

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- Secondary Data Analysis
- Experience Surveys
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- Focus Groups
- Projective Techniques



In experience surveys, persons who are being investigated.

Eg: a group of people asked for their choice for

# Exploratory Research

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Obtains information f  
that are similar to the



# Exploratory Research

A variety of methods are available to conduct exploratory

- Secondary Data Analysis
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- Focus Groups
- Projective Techniques



Small numbers of  
together to discuss or

# Exploratory Research

A variety of methods are available to conduct exploratory

- Secondary Data Analysis
- Experience Surveys
- Case Analysis
- Focus Groups
- Projective Techniques



Projective techniques involve questioning the respondent through tests, sentence completion, role playing techniques, etc.



# Conclusive research design

- It is more formal and structured
- Based on large representatives of samples and population
- It is designed to assist the decision maker in making a choice and selecting the best course of action
- **Classified as**
  - Descriptive research
  - Causal research



# Descriptive Research

- It will suitable when the researcher desire the characteristics of certain groups such as age, sex, occupation, income or education

Answers

who, What when where and how





## **Descriptive Research**

**when to use?**

- 1. To determine the characteristics of market such as**
  - 1. Size of the market**
  - 2. Buying power of the consumer**
  - 3. Product usage pattern**
  - 4. To find out the market share**
- 2. To determine the association of the two variables**  
**Sales**
- 3. To make prediction**
- 4. To estimate the proportion of people in a specific category**  
**( what % of population in a particular geographical area will be shopping in a particular shop?)**





## **Descriptive Research**

Two basic classifications

- **Cross-sectional studies**
- **Longitudinal studies**

## Descriptive Research

- Cross-sectional studies
- Longitudinal studies



Two basic classifications

**Cross-sectional study**  
of the population at  
time.

Can be done in two  
**Field study :**  
**field survey:**

## Descriptive Research

Two basic classifications

- Cross-sectional studies
- Longitudinal studies



These are the studies in which the occurrence is measured over a period of time.

- One method is to draw a single sample from the same sampling frame.
- A second method is to follow the same people are asked

## Descriptive Research

- Cross-sectional studies
- Longitudinal studies



Two basic classifications

**Cohort panel :** each member is surveyed at different time to arrive at the conclusion. It involves repeat measurement.

**Omnibus Panel:** An omnibus panel is a quantitative marketing research in which a variety of subjects is contacted over time.

Also called piggyback : multiple clients share the same panel.

# Difference between

## Exploratory research

- Concerned with why ?
- Does not required large sample
- Sample need not represent population.
- Imprecise: difficult in data collection
- No need of questionnaire

## Descriptive research

- What
- Large
- Sample represent population
- Stated
- Need

# Difference Between

## Exploratory research

- **Data collection methods are**
  - Focus group
  - Literature survey
  - Case study

## Descriptive research

- **Data collection methods are**
  - Use of standardized instruments
  - Longitudinal studies
  - Use of statistical analysis



# Causal Research Design

- Causality may be thought of as understanding relationships in terms of conditional statements of the form "if...then..."
- Establishes **cause and effect** relationship between variables



# Causal Research

- To establish the relationship between two variables, researchers need to carry an experiment.



# What is Experimentation?

- It is a process where one or other variable is manipulated which demonstrates the cause and effect.
  - **Independent variables:** - that over which the researcher has control and wishes to manipulate i.e. Price, Promotion.
  - **Dependent variables:** - that over which the researcher has no or no direct control, but has a strong interest in, e.g. profit, market share.
  - **Extraneous variables:** - those that may affect the dependent variable but are not independent variables.

# What is Experimentation?

- It is a process where one or other variable is manipulated which demonstrates the cause and effect relationship.
  - **Test units:** - are individuals, organizations, or groups whose response to the independent variable is being studied.



# Experimental Design

- It is a set of procedures specifying
  - The test units and how these units are to be subsamples,
  - What independent variables are to be manipulated
  - What dependent variables are to be measured
  - How the extraneous variables are to be controlled



# Experimental Design

- An experiment is a study in which the researcher manipulates one or more independent variables and then measures the effect on the dependent variable.
- Experiments are powerful techniques for establishing causal relationships.
- Many researchers consider experiments the gold standard of research design, in which all other research designs should be judged.
- Experiments are conducted both in the laboratory and in the field.



# Validity in Experimental

- Researcher has two goals toward exper
- 1 Draw valid conclusions about the e  
variables on the study group. Inter
  - 2 Make valid generalizations to a l  
interest. Exte



# Validity in Experimental

## Internal validity

**A measure of accuracy of an experiment. manipulation of the independent(Ad) variable caused the effects on the dependent(sales) variable.**

## External validity

**A determination of whether the cause and effect experiment can be generalized.**

# Types of Experimental designs

- Formal
- Informal



# Types of Experimental designs

- Formal
  1. Completely Randomized
  2. Randomized block design
  3. Latin square design
  4. Factorial design
- Informal
  1. Before –and – without control design
  2. After-only with control design
  3. Before and after with control design





# Types of Experimental designs

- Formal 1. Completely Randomized

Subjects are randomly assigned to experimen

Eg : if we have 8 patients and we wish to divide them into two groups of four, on the basis of treatment A and treatment B the Randomization provides an equal possible opportunity that the group of four will be selected from a set of eight and being treated with A and B.

## Types of Experimental designs

- Formal 2. Randomized block design

With a randomized block design, the experimental subjects are divided into subgroups called **blocks**. The variability within blocks is less than the variability between blocks.

Then, subjects within each block are randomized to different treatment conditions.





## Types of Experimental designs

- Formal 2. Randomized block design

Subjects are assigned to blocks, based on some characteristic. Then, within each block, subjects are randomized to treatments (either a placebo or a cold vaccine).

For this design, 250 men get the placebo, 250 men get the vaccine, 250 women get the placebo, and 250 women get the vaccine.



## Types of Experimental designs

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## Types of Experimental designs

- Formal 2. Randomized block design

It is known that men and women are physically different and react differently to medication.

This design ensures that each treatment group has an equal proportion of men and women.

As a result, differences between treatment groups can be attributed to gender.

This randomized block design removes gender as a source of variability and as a potential confounding factor.

# Types of Experimental designs

- Informal

## 3. Latine square design

It allows the researcher to statistically control non-interacting external variables as well as the independent variables.



# Types of Experimental designs

- Formal 4. Factorial design

A **Factorial Design** is an experimental set up in which multiple factors and their separate and combined effects on the subject of interest in the experiment are studied. Independent variable in the experiment is divided into subdivision of a factor.

# Types of Experimental designs

- Informal

1. Before-and –without control design

A set of single test group is selected and the dependent variable is measured prior to a specific treatment.

Subsequently treatment is introduced and the variable is again measured.

Eg : observe the level of bacteria in a pool, prior and after the chlorination treatment.



## Types of Experimental designs

- Informal 2. After-only with control design

Two areas i e

Test area and & control areas are selected

Treatment is applied to test areas.

The dependent variable is measured in

Eg : two adjacent fields of former is taken

In that one area is taken as test area and

And another area is not fertilized.

After three months variation is measured

Extraneous variables water, soil, sunlight



## Types of Experimental designs

- Informal 3. Before-and-after with control design

Two areas are selected and dependent variable is measured in both for common time period prior to treatment.

Then, the treatment is applied only in the experimental area. The dependent variable is measured again in both areas for an identical time period after the introduction of treatment.

# Classification of Experimental Design

## Experimental Design

### Pre experimental

One – Shot Case Study  
One –Group Pretest- Posttest  
Static Group

### True Experimental

Pretest- Posttest control  
Group  
Pretest-only control Group  
  
Solomon Four- Group

Quasi-  
Experimental  
  
Time Series  
  
Multiple



## Definition of Symbols

- X** = the exposure of the group to an independent treatment, or event, the effects of which are being studied
- O** = the process of observation or measurement of the dependent variable on the test units or group of units
- R** = the random assignment of test units or subjects to treatments



## Pre-experimental design

- Pre-experiments are the simplest form of research. In a pre-experiment either a single group is observed subsequent to some agent or treatment change.
- In other words, a single group is often studied between an equivalent non-treatment group and a treatment group.
- These designs do not control for extraneous variables.

# Pre-experimental design

## One-shot case study design

- Also known as the after-only design

Treatment	Post-test
X	O

A single group of test units is exposed to the treatment, then a single measurement on the dependent variable is taken.

( At TV programme commercial AD=X, Response = O )

# One-shot case study design

If lecturer wants to see if appraisal of students performs to become more confident. He tests it with 10 semester & appraise them. He finds that students are

Group	Treatment	Post
Experiment group	X	
Students	Appraisal	confi



# Pre-experimental design

## One-Group Pretest-Posttest Design

$O_1 \quad X \quad O_2$

The group of test units is measured twice

*First pre-treatment measure is taken*

*Then the group is exposed to the treatment*

*finally a posttreatment measure is taken*

*The treatment effect is calculated as  $O_2 - O_1$*



## One-Group Pretest-Posttest Design

A sales manager may wish to conduct a training programme to improve the knowledge of sales team members. The sales manager may measure the knowledge of team members as 'O1'. As the training programme is conducted, the sales manager may again measure the knowledge level of team members.

Group	Pre test	Treatment
Experiment group	O1	X
Sales team	Selling Skills	Training programme



# Pre-experimental design

## Static- Group Design

EG: X O1

CG: O2

It is a two group experimental design

*Experimental group (EG)*

*Control group (CG)*

*Measurements on both groups are made only  
and test units are not assigned at random*

## Static- Group Design

A researcher may wish to compare the effect of a medicine on a patient, and comparing his condition with a patient without the medicine

Group	Treatment
Experimental group	X
Patient	Medicine
Control group	
Patient	



# True-experimental design

- In this design, the researcher randomly assigns subjects to experimental groups and treatments to expect a change.
- They **employ both a control group and a treatment group** to see if the **change that occurs in both groups**.
- In this sense, we attempt to control for all other factors that might affect the outcome, at least consider their impact, while attempting to isolate the treatment is what truly caused the change.
- The true experiment is often thought of as the gold standard of research that can adequately measure the cause and effect relationship.

# True-experimental design

## 1. Pretest-Posttest Control Group design

Test units are randomly assigned to either the control group and a pre-treatment measure is

EG : R      01      X      02

CG : R      03      X      04

The treatment of effect is measured =  $(02-01)$



## 1. Pretest-Posttest Control Group design

How to measure the effectiveness of the advertisement

For this, two groups will be randomly selected, namely experimental and control groups respectively. A questionnaire will be given to both groups towards product. After that the members of the experimental group will be shown advertisement. After showing advertisement, a questionnaire will be taken from the both the groups to see the changes in attitude towards product.

Randomization	Group	Pre test	Treatment
R	<b>Experimental Group</b>	O1	X
	A group of people	Response to Questionnaire	Product advertisement
R	<b>Control Group</b>	O3	
	A group of people	Response to Questionnaire	



# True-experimental design

## 2. Post test-only Control Group design

It will not involve any premeasurement.

EG : R X O1

CG : R O2

The treatment of effect is measured =  $O1 - O2$



## 2. Post test-only Control Group o

Same example of previous can be tested. the researchers would not test the perspective of showing the advertisement related to them.

The perspective of the people would be measured the advertisement.

Randomization	Group	Treatment
R	<b>Experimental Group</b>	X
	A group of people	Product advertisement
R	<b>Control Group</b>	
	A group of people	





# True-experimental design

## 3.Solomon Four Group Design

EG1 : R      o1 X 02

CG1 : R      03 X 04

EG 2 : R      X 05

CG 2 : R      X 06

THIS DESIGN INT  
GROUPS.  
IT ALSO ALLOWS  
TO PRETEST ON T

### 3.Solomon Four Group Design

RANDOMI SATION	GROUP	PRE TEST	TREATMENT	POST TEST
R	EG 1	01	X	02
	25 TEACHERS	MORAL QUESTIONNAIRE	SENSITIVITY TRAINING	MORAL QUESTIONNAIRE
R	CG1	03		04
	25 TEACHERS	MORAL QUESTIONNAIRE		MORAL QUESTIONNAIRE
R	EG2		X	05
	25 TEACHERS		SENSITIVITY TRAINING	MORAL QUESTIONNAIRE
R	CG2			06
	25 TEACHERS			MORAL QUESTIONNAIRE

# Quasi Experimental design

- it results under followings
  - The researcher can control when measurements are taken
  - The researcher lacks control over the scheduling unable to expose test units to the treatment randomly



# Quasi Experimental design

- Time series design
  - This involves a series of periodic measurements for a group of test units.
  - The treatment is then administered by the researcher.
  - After the treatment, periodic measurements are taken to assess the treatment effect.

01 02      03      04      05      X      06      07



# Time series design

GROUP	PRETEST			TREATMENT
EXPERIMENTAL GROUP	01	02	03	X
A GROUP OF PEOPLE SUFFERING FROM AIDS	DEATH RATE (BEFORE 3 YEARS)	DEATH RATE (BEFORE 2 YEARS)	DEATH RATE (BEFORE 1 YEARS)	MEDICATION

# Quasi Experimental design

- Multiple Time series design

EG : O1      O2      O3      O4      O5      X      O

EG : O1      O2      O3      O4      O5      O



# Statistical Experimental design

- These consists of a series of basic experimen statistical control and analysis of external va
  - Randomized block design
  - The Latin square design and
  - The factorial design



# Statistical Experimental design

- Randomized block design

It is useful when there is only one major factor such as sales, store, size or income of the respondent, which is the dependent variable.





# Statistical Experimental design

- Latin Square design

it allows the researcher to statistically control for interacting external variables as well as to manage multiple variables.



# Statistical Experimental design

- Factorial design

it is used to measure the effect of two or more variables at various levels.

Like coffee

Like cold temperature

But like hot coffee

## Assignment 2

Define research design and Explain it  
examples.



# Observation Research- meaning

L/O: to be able to describe observation method and the associated key terms

## The Observational Method

- Involves systematically watching and recording what people say and do
- Naturally occurring behaviours only  
= no attempt to manipulate variables



We can get natural behaviour unchanged by researcher presence in research environment.



# Types of observation research

## **Type 1# Participant Observation:**

The participant observation means watching a situation or activities from inside by taking part in the observed.

Goode and Hatt define participant observation as "used when the investigator can go disguise himself as a member of the group". So in this kind of observation, to stay as a member in the group he wants to

# Types of observation research

## **Type 1# Participant Observation: Advantages**

### **(a) Observation of natural behaviour:**

The natural behaviour of the respondent in participant observation. (not knowing to group)

### **(b) Closeness with the group:**

In participant observation, the observer has a rapport with the respondents. He has a very close relationship with the group members.



# Types of observation research

## **Type 1# Participant Observation: Advantages**

### **(c) Studying the real character:**

Through participant observation the researcher conducts an intensive and inclusive study of the group and character of such group.



# Types of observation research

## **Type 2# Non-Participant Observation:**

When the observer observes the group without participating in the group activities, it is non-participant observation.

Here he does not try to influence them or take part in their activities.



# Conducting an observation study

- Planning for observation
- Execution and recording of observation
- Interpretation of observed results /findings



## Step 1 Planning for observation

- Specify specific units of behaviours to be observed
- Appropriate groups of subject
- Individual / group
- Length of observation – period, time
- Decide instrument of recording – videos, audio
- Special conditions

## Step 2 Execution and recording

## Step 3 findings



# Evaluation of observed research

- Capability of the observer
- Reliability
- Validity
- Description
- Statistical techniques

- <https://www.youtube.com/watch?v=e9peo0>