



# **ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY PALKULAM BUSINESS RESEARCH METHODS**

## **UNIT – II VALIDITY IN EXPERIMENTATION**

Validity refers to the extent to which the conclusions drawn from the experiment are true.

### **I- Internal validity :**

Refers to the extent to which the research design accurately identifies casual relationships.

### **History**

When extraneous factors that enter the experiment process between the first and later manipulation affect measure of the dependent variable.

### **Maturation :**

Changes in the dependent variable based on the natural function of time and not attributed to any specific event.

### **Testing**

When learned understanding gained from the first treatment and measure of the dependent variable distort future treatment and measurement activities.

### **Instrumentation :**

Contamination from changes in measurement processes observation technique and measuring instruments

### **Selection Bias:**

Contamination created by inappropriate selection or assignment process of test subject to experimental treatment groups

### **Statistical Regression:**

Contamination created when experiment group are selected on the basis of their extreme response or scores.

**Mortality :**

Contamination due to changing the composition of the test subjects in the experiment.

**Ambiguity :**

Contamination from unclear determination of cause effect relationship

**II - External Validity :**

Refer to the extent to which a casual relationship found in a study can be expected to be true for the entire target population.

**Treatment Vs Treatment**

When test subject in different treatment groups are exposed to different amount of manipulations.

**Treatment Vs Testing**

When the premeasurement process sensitizes test subject to respond in an abnormal manner to treatment manipulation.

**Treatment Vs Selection**

Generalising the results to other categories of people beyond those used in the experiment

**Treatment Vs Setting**

Generalising the results to other environment beyond the one used in the experiment.

**Treatment Vs History**

Using the existing functional relationship to predict future phenomenon outcomes.

**III - Construct Validity**

Refers to the extent to which the variables under investigation are completely and accurately identified prior to hypothesizing any functional relationships.

Inadequate pre-operationalization of variable

Contamination due to inadequate understanding of the complete make-up of the independent and dependent variable included in the experimental design.

#### Mano operation bias

Contamination created by using only one method to measure the outcome of the dependent variable.

#### Mano-method bias

Contamination due to assessing multi-attribute treatment manipulation using single item measuring instrument.

#### Hypothesis –guessing

Contamination by test subject believing they know the desired functional relationship prior to the manipulation treatment.

#### e) Evaluation Apprehension :

Contamination caused by test subjects being fearful that their actions or response will become known to others.

#### f) Demand Characteristic :

Contamination created by test subjects trying to behave in a socially acceptable manner during the experiment thus abnormal socially acceptable responses or behaviour.

#### g) Diffusion Of treatment

Contamination due to test subject discussing the treatment and measurement activities with individual yet to receive the treatment.

Improving the validity of experiment design :

#### a) Inclusion of control group

When designing an experiment the researcher must determine who will be assigned to the group that will be exposed to the manipulation and who will be assigned to the control that does not receive the manipulation. Control group represents the greatest strength of the experiment and the best way to ensure internal validity.

#### b) Time order of the manipulation exposure:

The researcher also must determine which variables, independent or dependent will occur first. This can be accomplished by using pre-experimental measure of the variables prior to manipulation or by establishing experimental treatment and control group that do not differ in terms of influencing the dependent variable before the manipulation takes place.

c) Exclusion of Non similar test subject

To increase internal validity the researcher can select only those test subject who have similar and controllable characteristics.

d) Matching Extraneous variable

Through the process of matching, the researcher measure certain extraneous variable on a individual by individual basis Those who respond similarly to the variables are then allocated to the experimental and control groups. Again this process can control for both selection and statistical regression threats and enhance internal validity.

e) Randomisation Of Test subjects to treatment groups

Randomization of the assignment of test subjects to the experimental and control groups can help make the groups equivalent . To enhance external validity the researcher should also randomly select setting and times for the experiment based on the population or event under investigation.

## Principles Of Experimental Design

a) Principle Of Replication :

According to this principle the experiment should be repeated more than once. So each treatment is applied in many experimental units instead of one. By this statistical accuracy of the experiment can be increased. This aims for increase in accuracy with which effects and interactions can be estimated.

#### b) Principle Of Randomisation

It provides protection, against the effect of extraneous factors in experiment. This principle indicates that we should design or plan the experiment in such a way that the variations caused by extraneous factors can all be combined under the general heading of chance.

#### c) Principal Of local control

Under this method we first divide the whole unit into several homogenous parts , known as blocks and then each such block is divided into parts equal to the number of treatment. Then the treatment are randomly assigned to these parts of the block.