Research design

2nd year – institution of nursing

Introduction to research

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Definition

- The research design refers to the researcher overall plan for answering the research question or testing the research hypotheses.
- The research design organizes all the components of the study in a way that is most likely to lead to valid answers.

Purposes of Research Design

1. It provides the scheme for answering research question.
2. It maintains control to avoid bias that may affect the outcomes.
3. It determines how it will be organized, when data will be collected & When intervention will be implemented
4. It maximizes objectivity in data collection.
5. It organize the study in a certain way defending the advantages of doing so while being aware and caution about potential disadvantages.

Classification of research design :-

There are several ways to classify research designs under the two broad categories

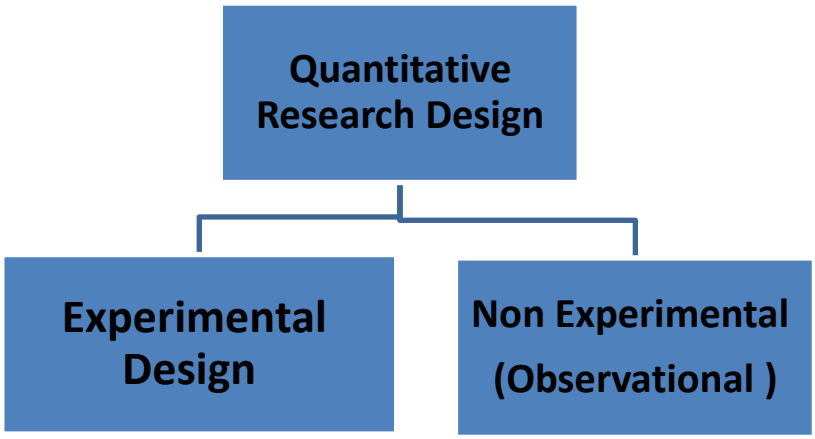
1- Quantitative Research Design

2- Qualitative Research Design

1- Quantitative Research Design :-

Quantitative research methods enable the researcher to manipulate the numerical data to answer the research question and draw inference from their finding, experimental study are particular suitable for testing cause and effect relationship that influences the results .

Types of Quantitative Research Design



A. Experimental Research Design:-

- Experimental design is commonly used in natural or basic sciences. It refers to a research design that is characterized by a comparison among groups that are as equal as possible. The design permits the researcher to establish cause-effect relationships and therefore accurately predict and explain phenomena. Here the investigator attempts to establish that the results of the study can be accurately attributed to the manipulation of the variable under examination. Experimental Designs are used for testing **cause-and-effect** relationships.
- Experimental differ from non-experiments in the researcher is an active agent in experimental work rather than a passive observer.

- The primary purpose for conducting experiments is to determine the existence of cause and effect relationship between the two variables under investigation while testing hypothesis.

***Characteristics of Experimental Research Design:-**

1- *Manipulation:-*

- It involves doing something to or act on at least one group of subjects in research study.

The introduction of that "something" {often referred to as the experimental treatment or experimental intervention}.

2- *Control:*

- The term control group refers to a group of subjects whose performance on a dependent variable is used as a basis for evaluating the performance of experimental group. .

3- *Randomization:*

- It involves random selection of subjects from the target population, to ensure that every subject has an equal chance of being selected and being assigned to any group.

Types of experimental design:-

a) True or classic experimental design

- ✓ Pre test – post test control group
- ✓ post test -only control group
- ✓ Solomon four group

b) Quasi-experimental design:-

- ✓ Non –equivalent control
- ✓ Group time series

c) Pre-experimental design:-

- ✓ One –shot case study
- ✓ One group pretest – posttest

Types of Non -experimental design:-

- ✓ Descriptive research
- ✓ Correlation research

A) Experimental design:-

a) True or classic experimental design

- In pre-post-test design, subjects are randomly assigned to either the control group or the experimental group.
- Each group is observed (done pre-test), the experimental group receive treatment, while the control group not receive treatment.
- The researcher then observe the two groups again (done post-test). To determine whether the treatment makes a difference or no.

b). After-only or post-test experimental design:-

- In this design, collecting data from subjects only after the experimental treatment.

c). Solomon four-group design:-

- In this design the experimenter would randomly divide the sample into four separate groups, two experimental groups and two control groups.
- The first experimental group would e given the pre-test, then they would be given appropriate treatment, and then they given the post test.
- The first control group given pre-test, and then given post-test and no given treatment.

- The second experimental group would not be given pre-test, then they given treatment, and then given post-test.
- The second control group would have nothing done until post-test.
- If both experimental groups show similar results at the end of the treatment and there is a significant difference between experimental and control groups.
- If the four groups do not show any similar results, the experimenter can conclude the null hypothesis that there was no statistically significant difference between the four groups

B. Quasi-experimental design:-

- A design similar to a true experimental design. A quasi-experimental can be defined as a quantitative research design in which there is always manipulation of the independent variables and sometimes control measures are employed, but the other true experiment, such as random assignment of subjects is absent.

Nonequivalent control group design

- It is on in which the control group is not selected by random means.
- Some group are nonequivalent than other
- It is similar to the pretest posttest control group design expect there is no random assignment of subjects to the experimental and comparison groups.

Time-series design

- A time series is perhaps the most common type of longitudinal (over time) research found in criminal justice.
- A time series can be interrupted or no interrupted. Both types examine changes in the dependent variable over time, with only an interrupted time series involving before and after measurement.

Here, the Researcher periodically observes or measures the subjects. The experimental treatment is administered between two of observation

c) Pre-experimental design:-

One shot case study

A single group exposed to an experimental treatment then observed after the treatment

One group pretest posttest design

It provides a comparison between a group of subjects before and after the experimental treatment.

B) ***Non-experimental design or Descriptive Studies:***

- In non-experimental design, the researcher collects data without introducing any treatment or change.
- The researchers collects data and describe phenomena as they exist, variables are not manipulated because no intervention take place.
- Non-experimental studies are present-oriented. It attempts to describe what exists. Variable are not manipulated, nor is the setting controlled. The analysis of data often leads to the formation of hypothesis that can then be tested experimentally.

- Non-experimental or descriptive studies can be **exploratory** (simply exploring what exists without having any research data in the area), or **explanatory** research (explaining a particular phenomenon), and **correlation design**s (exploring the relationship between different states).

❖ ***Reasons for Undertaking Non-experimental Studies:***

- For some research, it is not practical to conduct a true experiment/manipulate variables
- For some situations, it is more realistic to explore phenomena in more natural manner
- Non experimental research is often needed to scope out the experimental one

❖ ***Characteristics of Non-experimental Design***

1) A research design in which a researcher observes a phenomenon without manipulating the independent variables(s)
2) No manipulation
3) Independent variables have already occurred, so no control over them
4) Clear, concise problem statement that is based on a theoretical framework, or natural phenomenon.

Types of non-experimental design:

There are two main types of non- experimental research design:

Descriptive research, they are researches that do not focus on relationships among variables. Their purpose is to observe, describe and document situations as it occurs in natural setting.

- ❖ It is designed to summarize the status of phenomena of interest, as they currently exist.
- ❖ It provides information about the occurrence, and frequency of occurrence.

2. Correlation research, the primary aim of this research is to explain the nature of relationship in the real world and not to examine cause and effect. The non- experimental design is conducted to examine whether relationships occurs between or among two or more variables. If the relationship exists, the correlation study clarifies the type is it positive or negative relationship, and the degree of statistical significant relationship.

- **Interrelationship/difference**
  - Correlation studies
  - Ex post facto studies
  - Prediction studies
  - Developmental studies
  - Cross-sectional & longitudinal studies