Research Design

Research design

Conceptualizing a research design is the important steps in planning a research study.

The main function of a research design is to explain how we will find answers to the research question.

For any investigation, the selection of an appropriate research design is crucial in enabling us to arrive at valid findings and conclusion.

This plan or design is generally vague and tentative in the beginning. As the study progresses and insights into it deepen it undergoes many modifications and changes.

A series of decisions in working out of a plan include what, why, where, when, who, and how of the research.

Research design

Research design is a logical structure of an enquiry. The essence of the research design constitutes the given research question or theory, type of evidence required to answer the question or to test the theory in a convincing manner.

A researcher needs to have clarity on the research questions and then the research design will flow to the research questions. **To ensure that the evidence obtained enables us to answer the initial research questions as unambiguously as possible is the main function of a research design.**

Research design is the plan, structure, and strategy of investigation conceived so as to obtain answers to research questions and to control variance.

The structure of the research is the outline of the research design, and the scheme is the paradigm of operation of the variable.

Need for research design

Research design can be understood as that which gives the blueprint for collection, measurement, and analysis of data. The design helps researchers to utilize available resources efficiently to achieve research objectives.

Research design is essential because it facilitates the smooth flow of various research processes. A good design means that good research results can be obtained with minimum utilization of time, money, and effort.

An ideal research design can be developed by considering the available resources such as time, manpower, and money before beginning the design.

If the initial research design is not properly prepared, it will jeopardize the entire research process and will fail to meet the objectives.

Characteristics of a good research design

A good research design should minimize bias and maximize accuracy of the requirement, and it should provide adequate information so that the research problem can be analyzed on a wide perspective.

Characteristics: Flexibility, Adaptability, Efficiency, Being economical

A research design is considered to be good if it provides specific answers to the research question or questions, adequately tests the hypothesis, presents the appropriate research question or research problem, adequately controls the extraneous independent variable, generalizes the results of a study to other subjects, and provides internal and external validity.

A good research design will clearly describe the techniques to be used for selecting samples, collecting data, and managing costs and other aspects that are essential for conducting research.

Functions of a research design

A research design helps a researcher to obtain dependable and valid answers to research questions.
Research problems are stated in the form of null and alternate hypothesis. The research design guides the researcher on how to collect data for testing and formulation of the hypothesis.

A research design controls variance. Research design provides the researcher with a set of proposal for studying research questions. It dictates boundaries of research activity and enables the investigator to channel their energies in a specific direction. It enables the investigator to anticipate potential problems in the implementation of the study and to assist the investigator in providing answers to various kinds of research questions.

Research design concepts

Dependent and Independent Variables If a variable is dependent on the result of some other variable, it is then called a dependent variable. An independent variable is not dependent on any other variable with reference to that particular study.

Extraneous Variables are independent variables that are not directly linked with the study but may influence the dependent variable.

Control is essentially devised to minimize the effects of extraneous variables. This is an important characteristic of a good research design.

Confounded Relationship When a dependent variable is affected by the influence of an extraneous variable, then the relation among the dependent and independent variables is confused or confounded by an extraneous variable.

Research Hypotheses A research hypothesis links an independent variable to a dependent variable. It should generally contain a dependent and an independent variable.

Classifications of research designs

Exploratory studies, which include techniques such as Secondary Data Analysis, Experience Surveys, Focus Groups, and 2-Stage Design

Descriptive studies

Causal studies under which causal relationships are studied, such as symmetrical reciprocal and asymmetrical relationships

Example

A research design for a study investigating the impact of online learning on student performance

1. Research Problem
With the increasing adoption of online learning, there is a need to evaluate its effectiveness in enhancing student academic performance compared to traditional face-to-face learning.

2. Research Objectives

- To compare the academic performance of students in online and traditional learning environments.
- To analyze student engagement levels in online versus in-person settings.
- To assess the challenges students face in online learning.

3. Research Questions

1. How does online learning affect students' academic performance?
2. What are the levels of student engagement in online versus traditional learning?
3. What are the common challenges students face in an online learning environment?

Example

4. Research Hypothesis

- **H_0 (Null Hypothesis):** There is no significant difference in academic performance between students in online and traditional learning environments.
- **H_1 (Alternative Hypothesis):** Students in online learning environments perform better/worse than those in traditional learning environments.

5. Research Methodology

a. Research Design Type

This study follows a **quasi-experimental research design** with a **comparative approach**.

b. Sampling Method

- **Population:** University students enrolled in both online and traditional courses.
- **Sample Size:** 200 students (100 from online courses and 100 from traditional courses).
- **Sampling Technique:** Stratified random sampling based on academic discipline and course level.

Example

c. Data Collection Methods

- **Quantitative Data:**
  - Academic performance (GPA, exam scores) from institutional records.
  - Student engagement through survey questionnaires (Likert scale).
- **Qualitative Data:**
  - Student interviews on challenges faced in online learning.

6. Data Analysis Techniques

- **Descriptive Statistics:** Mean, standard deviation, and frequency analysis.
- **Inferential Statistics:**
  - Independent t-tests to compare student performance between online and traditional groups.
  - Thematic analysis for qualitative responses.

Example

7. Ethical Considerations

- Informed consent from participants.
- Confidentiality and data protection.
- Voluntary participation with the right to withdraw.

8. Expected Outcomes

- Insights into whether online learning positively or negatively impacts student performance.
- Identification of challenges that may need to be addressed in online education.
- Recommendations for improving online learning effectiveness.

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