ALMUSTAQBAL UNIVERSITY

College of Health and Medical Techniques
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Stage : Fourth year students
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Classification of Scientific Researches

Scientific research can be classified based on various criteria, including the purpose of the research, the methodology used, the nature of the study, and the type of data involved. Understanding these classifications is important for researchers to effectively design and conduct their studies

1. Based on Purpose

Scientific research can be classified by its **objective**:

A. **Exploratory Research**:

Investigates new problems or phenomena where little prior knowledge exists. The exploration of new phenomena in this way may help the researcher's need for better understanding.

B. **Descriptive Research**:

Aims to make careful observations and detailed documentation of a phenomenon of interest. These observations must be based on the scientific method, ensuring they are replicable and precise. It is directed toward answering questions such as "what" rather than "why."

C. **Explanatory Research**:

Seeks to explain relationships and causes. It answers "why" and "how" questions. This type of research looks for explanations of observed phenomena, problems, or behaviors.

Explanatory research explains (How the parts of a phenomenon are related to each other).
Explanatory research asks the "Why" question

D. **Diagnostic Research**:

Identifies causes of a problem and possible solutions.

E. **Predictive Research**:

Expects future occurrences based on current data.

F. **Comparative research:**

To identify similarities and differences between units at all levels

G. **Causal research:**

It aims at establishing cause-and-effect relationships among variable**s**

2. Based on Methodology

This classification focuses on **how** the research is conducted:

A. Qualitative Research:

Involves non-numerical data like interviews or observations analysis.

Qualitative research involves collecting and analyzing non-numerical data to understand concepts, opinions, or experiences. Common methods include interviews, and observations. Unlike quantitative research, qualitative research does not rely on numbers and data; instead, it is based on information collected by talking to people who have a particular medical condition and people close to them.

B. Quantitative Research:

Uses numerical data and statistical methods to test hypotheses and measure variables. It involves the systematic investigation of phenomena by gathering quantifiable data and performing statistical, mathematical, or computational techniques. It relies on numerical data to establish relationships between variables and test hypotheses. Common methods include experiments, and statistical analysis.

C. Mixed-Methods Research:

Combines both qualitative and quantitative approaches for a comprehensive analysis. Mixed methods research combines quantitative and qualitative methods to provide a more comprehensive understanding of the research problem. This approach enhances the strengths and diminishes the weaknesses of both quantitative and qualitative research. Data in mixed research is a mixture of variables, words, and images.

What are the main differences between quantitative and qualitative research?

Quantitative research uses numerical data and statistical analysis, while qualitative research uses non-numerical data like interviews and observations to understand concepts and experiences.

Variables in Scientific Research

Variables are characteristics or attributes that can be measured or observed in a study. They can vary from one situation to another. Some examples of variables include age, sex, weight, height, health status, annual income, and smoking habits … etc.

In experimental research, researchers choose one or more variables (independent variables) to see if they have an effect on other variables (dependent variables). Understanding variables is essential for designing and interpreting scientific research.

Types of Variables

Here are some of the variables used in scientific research.

- **Independent Variables**: These are the variables that are manipulated by the researcher to observe their effect on the dependent variable.
- **Dependent Variables**: These are the variables that are measured or observed in response to changes in the independent variable.
- **Control Variables**: These are variables that are kept constant to prevent them from influencing the relationship between the independent and dependent variables.

3. Based on Application

Research can also be classified based on its application and the type of knowledge it seeks to generate

This refers to the **practical use** of research findings:

A. Basic (Theoretical or Fundamental) Research:

Basic research is an investigation of basic principles and reasons for the occurrence of a particular event or process or phenomenon. It is also called **theoretical** research.

It provides a systematic and deep insight into a problem and facilitates the extraction of scientific and logical explanations and conclusion on it.

Basic research, also known as **fundamental research**, aims to develop new scientific theories or modify existing ones to expand the field of science and human knowledge.

B. Applied Research:

Focuses on solving specific, practical problems. It is often used in industry, healthcare, and similar fields.

Applied research seeks to solve practical problems using the findings of fundamental research. Applied research draws on theory to generate practical scientific knowledge and is commonly used in many fields such as engineering, computer science, and medicine.

The research which its outcome has immediate application is also termed as applied research

Therefore theoretical research develops models and frameworks; while practical research tests them in real-world settings.

4. Other Classifications

Additional dimensions include:

A. Universalist vs Specialist:

Universalist research aims for broad applicability; while **specialist** research focuses on a specified field

B. Chronological مرتب زمنيا vs Systematic:

Chronological research traces developments over time; **systematic** research follows structured protocols.

C. Novelised vs Justificatory:

Novelised research explores new ideas ; **justificatory** research defends existing theories.

In Conclusion

Understanding the classification of scientific research is essential for selecting appropriate methods, framing research questions, and applying findings effectively.