

Research Methodology



by

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Introduction to research



- ❖ Systematized effort to gain new knowledge (Redman and Mory, 1923).
- ❖ Research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue (Creswell, 2008).

Aim?

- The main aim of research is to find out the truth which is hidden and which has not been discovered yet.



Objectives?

- 1-To gain familiarity with a phenomenon or to achieve new insights into it.
2. To portray accurately the characteristics of a particular individual, situation or a group.
3. To determine the frequency with which something occurs or with which it is associated with something else.
4. To test a hypothesis of a causal relationship between variables.

Research consists of **three steps**

Create a question

**Collect data to answer
the question**

**Present an answer
to the question**

How to create a question ?



Critical thinking

1. Desire to get a **research degree** along with its consequential benefits
2. Desire to face the challenge in **solving the unsolved problems**. i.e., concern over practical problems initiates research.
3. Desire to get intellectual joy of doing some **creative work**.
4. Desire to be of **service to society**.
5. Desire to get **respectability**.
6. Others

Types of research

- *Descriptive vs. Analytical*
- *Applied vs. Fundamental (Basic)*
- *Quantitative vs. Qualitative*
- *Conceptual vs. Empirical*
- *Some others*

Descriptive research

- Includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present.
- The main characteristic of this method is that the researcher has no control over the variables; he can only report what has happened or what is happening.
- The methods of research utilized in descriptive research are survey methods of all kinds.

Analytical research

- The researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material.
- Analytical research is conducted in a variety of ways including literary research, public opinion, scientific trials and Meta-analysis.



Descriptive
research



Describes the fact

Analytical
research



Why it is that way or **how** it
came to be

Applied research

- Aims at finding a **solution** for a scientific/practical problem.

Examples:

-Investigate methods to:

- Improve the color stability of resin composite.
- Treat or cure a specific disease.
- Improve the energy efficiency of homes, offices, or modes of transportation.

Fundamental (Basic or pure) research

- Mainly concern with generalizations and with the **formulation of a theory**.
- Scientist's **curiosity** or interest in a scientific question.

Examples:

- How does implant integrate with the jaw bone?
- How did the universe begin?
- What are protons, neutrons, and electrons composed of?

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graph LR; A([Fundamental research]) --> B[Developing new theories]; C([Applied research]) --> D[Finding a solution for a certain problem];
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Fundamental
research

Developing new
theories

Applied
research

Finding a **solution** for a
certain problem

Quantitative research

- Based on the measurement of quantity or amount.
- Uses measurable data to formulate facts in research.
- Data analysis is statistical.

Examples:

- Survey conducted to understand the amount of time a dentist needs to perform scaling and polishing.
- Experiments conducted to understand the amount of implant insertion torque needed to achieve an acceptable implant primary stability.

Qualitative Research

- Concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind.
- In-depth interviews are optimal for collecting data.
- Data analysis in non - statistical

Examples:

- ✓ Researches about reasons of human behavior, opinions, beliefs and emotions.
- ✓ Research designed to find out how people feel or what they think about a particular subject or institution

Conceptual research

- Is that related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones.

Examples:

- ❖ The most famous example of a conceptual research is Sir Issac Newton. He observed his surroundings to conceptualize and develop theories about gravitation and motion.

Empirical research

- Relies on experience or observation alone, often without due regard for system and theory.
- It is data-based research, coming up with conclusions which are capable of being verified by observation or experiment.
- More reputable in medical researches than conceptual research
- It could be called (experimental type of research).

Examples:

Testing whether drinking coffee after tooth extraction results in bleeding.

Other types of research

- They are variations of one or more of the above stated approaches based on either the **purpose of research**, or the **time required** to accomplish research, on the **environment in which research is done**.

Types of researches based on time

**One time
research**

**Longitudinal
studies**

Types of researches based on environment

Field setting
research

Laboratory
research

Simulation
research

Clinical research

- Such research follow **case-study methods** or in-depth approaches to reach the basic causal relations. Such studies usually go deep into the causes of things or events that interest us, using **very small samples** and **very deep probing data gathering devices**.
- Determines the **safety and effectiveness** (efficacy) of medications, devices, diagnostic products and treatment regimens intended for human use.

Exploratory vs Formalized research

- **Exploratory research** is the development of hypotheses rather than their testing.
- **Formalized research** studies are those with specific hypotheses to be tested.



Historical research

- Utilizes historical sources like documents, remains, etc. to study events or ideas of the past, including the philosophy of persons and groups at any remote point of time

❖ Please read (Kothari, “Research Methodology Methods & Techniques”, Second Edition) for more information

*Thank
you*

