Animesh Hazari

Research Methodology for Allied Health Professionals

A comprehensive guide to Thesis & Dissertation

Springer

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Chapter 1
Introduction to Research Methodology

1.1 Overview

The term "research methodology" most often echoes among students, research scholars, and faculty members. Though the application of research methodology is diverse, we shall focus on the content specific to academia and industry. This book would be most helpful to health science students and allow them to learn the process of research in a simple and step-by-step process. In my personal experience, I have found that students are very apprehensive when it comes to learning research methodology as a subject. They often encounter problems in understanding the research methodology as the process starts and throughout the course. At times, they may have completed their research but failed to understand the whole process of how scientifically it was conducted.

1.2 Defining Research Methodology

It is an essential process of any scientific study, which serves as a framework for processing and achieving the predicted outcomes of the study. It is commonly defined as a systematic and organized process of collecting, analyzing, interpreting, and presenting information to answer specific questions or solve problems. It is a vital component of the scientific method and plays a crucial role in advancing knowledge in various fields, such as science, geography, astronomy, humanities, and technology. In this chapter, we will try to give a general overview of the research methodology and its significance.

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1.3 Significance of Research Methodology

The process of research methodology has crucial significance to scientific research with a wide application to academia and industry. The process of sound research methods plays a pivotal role in producing valid and meaningful research outcomes. It establishes the foundation for effective data collection, analysis, and interpretation, ensuring that research findings are reliable. A well-designed research methodology also enhances the reproducibility of research, allowing other researchers to replicate and validate the study's result. The few most common significances have been listed below:

1.3.1 Advancing Knowledge

A well-defined research methodology is a foundation upon which scientific understanding is built and contributes to the expansion of knowledge by discovering new facts, uncovering relationships between two or more variables, and refining existing theories. For example, the current scientific understanding of "big bang theory" is being redefined with the advanced findings from the James Webb Telescope. It may be general information to the public domain; however, it is important to understand that any conclusion made upon this would have, and will undergo rigorous scientific research methods.

1.3.2 Problem-Solving

Research helps identify and address real-world problems and challenges. It provides evidence-based solutions to issues faced by individuals, organizations, and society. For example, if one decides to identify the correct dose of a new drug to treat diabetes effectively, he/she has to conduct research on real patients suffering from the disease and then study the effect of the drug.

1.3.3 Decision-Making

Research findings are required to make an informed choice and decision. For example, a health policy prepared by the government health agencies for "Covid relief and prevention" would require a systematic research process. In addition, the policy of one country would differ from the other due to various factors, which indeed have been further researched. Therefore, if you are a part of such an organization, or have

the responsibility to contribute directly or indirectly where a decision has to be made, well-defined research needs to be conducted.

1.3.4 Validating Claims

Research allows for the validation or refutation of claims, ensuring that information is accurate. For example, a pharmaceutical company claims that they have produced a drug to control cancer. The drug would require going through a process of extensive research and testing before this claim could be validated.

1.4 Key Components of Research Methodology

The research methodology encompasses several essential components, each contributing to the overall research process. These components include formulating a hypothesis, research design, sampling techniques, data collection methods, data analysis procedures, and ethical considerations. Understanding these components is vital for researchers to design and execute their studies effectively. In the subsequent chapters, we will learn each component in detail.

1.5 Research Approaches

There could be various approaches to research depending on the nature of the research question and the available resources. It commonly includes quantitative, qualitative, and mixed-method research. Each has its strengths and weaknesses; we will learn about them in the upcoming chapter.

1.6 Research Design

The research design is a fundamental aspect of research methodology, outlining the overall strategy and structure of the study. It includes decisions regarding the research type (e.g., descriptive, experimental), the selection of variables, and the determination of the study's scope and timeframe. We must carefully consider the design to ensure that the study aligns with their research objectives. These designs will be explained in detail with suitable examples in the upcoming chapters.

1.7 Types of Research

The research types are classified as follows:

1.7.1 Basic Research

This type of research is conducted to expand fundamental knowledge and understanding in a particular field without any immediate or specific application. Basic research contributes to the development of theories and concepts.

1.7.2 Applied Research

Applied research aims to address specific practical problems and provides solutions to real-world issues. It often builds upon the findings of basic research and seeks to apply them in practical contexts.

1.7.3 Quantitative Research

In quantitative research, data is collected in numerical form and analyzed using statistical methods. Researchers use surveys, experiments, or structured observations to gather data.

1.7.4 Qualitative Research

Qualitative research focuses on understanding and interpreting non-numerical data, such as interviews, focus groups, case studies, and observations. It aims to explore complex phenomena and gain an in-depth understanding of social behavior and experiences.

1.8 Research Process

The process of research follows a systematic and stepwise execution of tasks as listed below. Each process will be described in detail in the upcoming chapters.

1.8.1 Formulating Research Questions

The first step in any research project is to define clear and specific research questions or objectives. These questions guide the entire research process.

1.8.2 Literature Review

Researchers conduct a comprehensive review of existing literature and studies related to their topic. This step helps them understand what has already been explored, identify gaps in knowledge, and refine their research questions.

1.8.3 Research Design

Researchers choose an appropriate research design, which includes selecting the methods and procedures to collect and analyze data. The design should align with the research questions and objectives.

1.8.4 Data Collection

This step involves gathering data using methods such as surveys, experiments, interviews, or observations. Researchers should ensure data quality and reliability.

1.8.5 Data Analysis

Once the data is collected, it is analyzed using appropriate statistical or qualitative techniques, depending on the research design.

1.8.6 Drawing Conclusions

Researchers interpret the results of the data analysis and draw conclusions based on the evidence gathered during the study.

1.8.7 Reporting and Dissemination

The final step involves communicating the research findings through academic papers, reports, conferences, or other appropriate channels.

1.9 Summary

Research is a powerful tool for acquiring knowledge, solving problems, and making informed decisions. Understanding the significance of research, and steps involved can help researchers conduct meaningful studies that contribute to the advancement of knowledge thereby benefiting society. This chapter introduces research methodology, highlighting its importance and key components. By understanding research methodology, researchers can design and conduct studies that yield reliable and valid results. The subsequent chapters of this book will deliver deeper insights into each component of research methodology, equipping researchers with the knowledge and skills necessary for conducting high-quality research.