

# **Research Fundamentals and Qualitative Methodology: A Handbook for Emerging Health Sciences Scholars**

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# Abstract

This handbook provides an in-depth introduction to research fundamentals and qualitative methodology for emerging health sciences scholars. It explores key concepts in research design, data collection, and analysis, with an emphasis on practical strategies for applying qualitative research in diverse health contexts. Topics include literature review techniques, ethical considerations, sampling strategies, and methods for ensuring trustworthiness in qualitative studies. The text is designed to support both undergraduate and postgraduate health sciences students, as well as early-career researchers, in developing the skills required to design and execute rigorous research projects.

**Keywords:**

Research methods; Qualitative methodology; Health sciences; Nursing research; Trustworthiness in research; Data collection; Data Analysis

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## **DEDICATION**

I dedicate this book to Joyce Lomokie Adjokatse. She is the backbone of the time availability I get for my writing. As a virtuous woman who takes care of our children, Brain Banlayngnan Laari, Princess Benita Loomngnan Laari, and Ivan Yenungnan Laari, I am able to work long hours without worrying. From the bottom of my heart, I am deeply grateful for your unwavering support during my most vulnerable moments.

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## **ABOUT THE AUTHOR**

Luke Laari obtained his PhD in Nursing at the University of KwaZulu Natal (UKZN), Master of Nursing (Nursing Research), and Honours in Nursing Education in South Africa. He is a senior lecturer in the School of Nursing and Midwifery at the University of Ghana. Luke is actively involved in the supervision of masters and doctoral students. He has taught research methodology for over a decade in Health Training Institutions, now teaches nursing theories at the University of Ghana, and is passionate about nurse-patient encounters and interactions. His teaching philosophy postulates knowledge to be constructed and interpreted based on previous understanding, and a teacher serves as a facilitator, mentor, and coach. Every student is unique and requires a socially conducive learning environment to fully construct and interpret what they receive from teachers and colleagues in their learning space. He believes in lifelong, self-directed learning and, as such, considers problem-based learning an excellent instructional methodology for educating health science students at all levels.

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## PREFACE

*Research Fundamentals and Qualitative Methodology: A Handbook for Emerging Health Sciences Scholars* is intended for health sciences students who see research as a journey worth travelling. The major purpose of this book is to provide learning material about the systematisation of scientific inquiry as a general guide to novice researchers through the research process and to stimulate awareness of the countless researchable and research-needed questions encountered daily in healthcare practice.

The students are introduced to a unique language, new rules, and new experiences in such a way that it will assist them in expanding their perceptions and methods of reasoning. This book is not intended as an all-inclusive source that provides all the answers relating to research and its processes; this should be seen, rather, as a companion for quick referencing when carrying out a research project.

As all healthcare professionals' research roles are to contribute to the development of evidence-based practice, I trust that this book will continue to be a priceless source to students and researchers. My belief is that research is an intellectually and professionally rewarding field, and that developing research skills and creating a research culture is critical to the health sciences. As such, this book will facilitate students understanding and awaken curiosity and interest in research.

In my experience, most students become competent at research methods during their coursework but struggle to generate interesting or useful research questions or carry out a research project. To address this deficit, I have conceived this book and provided detailed descriptions, intended to provide a guide for health sciences students, to explore and appreciate research as a key roadmap to scholarship, which will provide essential skills for researchers.

**Luke Laari**  
**March 6, 2025**

## **STRUCTURE OF THE BOOK**

This book is arranged into six parts and subdivided into 22 chapters. The parts cover research fundamentals, literature and designs, measurement and variables, and sampling and instruments. These four parts describe the basics and an introduction to research in health sciences for both undergraduate and postgraduate students who will want to revise their research. Part five covers some aspects of advanced qualitative methods with descriptions of bits of qualitative data collection, qualitative data saturation, and qualitative data analysis. The final section delves into the philosophical underpinning, discussing the relationship between theory and research, along with research paradigms and frameworks.

### **PART 1: RESEARCH FUNDAMENTALS**

Chapter 1: Introduction to Research Fundamentals

Chapter 2: Synopsis of the Research Process

Chapter 3: Research Endeavours

Chapter 4: Research Hypothesis and Questions

### **PART 2: LITERATURE AND DESIGNS**

Chapter 5: Literature

Chapter 6: The Process of Literature Review

Chapter 7: Quantitative Research Designs

Chapter 8: Qualitative Research Designs

Chapter 9: Mixed Methods Designs

### **PART 3: MEASUREMENT AND VARIABLES**

Chapter 10: Conceptualisation and Operationalisation

Chapter 11: Level of Measurements

Chapter 12: Research Classifications and Variables

Chapter 13: Validity and Reliability

### **PART 4: SAMPLING AND INSTRUMENTS**

Chapter 14: Ethical Considerations

Chapter 15: Sampling Techniques

Chapter 16: Instruments and Methods for Data Collection

Chapter 17: Research Data Analyses

**PART 5: ADVANCED QUALITATIVE METHODS**

Chapter 18: Major Qualitative Data Collection Methods

Chapter 19: Qualitative Interviews

Chapter 20: Qualitative Data Saturation

Chapter 21: Qualitative Data Analysis

**PART 6: PHILOSOPHICAL UNDERPINNING**

Chapter 22: Theory and Research

Chapter 23: Frameworks in Research

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## **PART 1: RESEARCH FUNDAMENTALS**

The research fundamentals cover chapters 1 to 4 with discussions covering the introduction to research fundamentals, the research process, research endeavours, and research hypotheses and questions. Each of these chapters gives details in simple language for better comprehension of foundational knowledge in a scientific inquiry.

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# CHAPTER 1

## INTRODUCTION OF RESEARCH FUNDAMENTALS

Chapter one presents sources of knowledge acquisition available to mankind, indicating several non-scientific ways that man can learn and acquire knowledge. The scientific methods accepted by many as a credible method in investigation are briefly described with their limitations and concluded with a foundation of research knowledge with an emphasis on research as a process with key terminologies defined.

### Sources of Knowledge Acquisition

Knowledge acquisition is dealt with in a branch of philosophy referred to as epistemology. There are several sources of knowledge; however, epistemologists generally recognise at least four different sources of knowledge, including *intuitive knowledge*, which takes forms such as belief, faith, intuition, etc. It is based on feelings rather than hard, cold "facts." There is also *authoritative knowledge*, which is based on information received from people, books, a supreme being, etc. Its strength depends on the strength of these sources. The last two are *logical knowledge*, which is arrived at by reasoning from "point A" (which is generally accepted) to "point B" (the new knowledge), and *empirical knowledge*, which is demonstrable, objective facts that are determined through observation and/or experimentation.

There are also methods that are available to be used by man to acquire knowledge. These methods have been used in times past and are still being used today in a different situation to effect learning and acquire knowledge.

Few of these methods are briefly explained ahead.

**Tradition:** This refers to truths or beliefs that are based on customs and past trends. This kind of knowledge is handed down from generation to the next and leads to actions that occur because it has always been done that way. This refers to rituals in nursing, such as routine checking of vital signs and regular visits to anti-natal, where most individuals participating in or performing these rituals are not able to give a good reason why this is being done.

Traditions have advantages, and this includes the ability to positively influence nursing because they were developed from effective past experiences. Each person is not required to start from scratch in attempting to deal with daily

problems. Tradition facilitates communication and provides a common frame of reference.

Traditions, however, come with some disadvantages, as they can narrow and limit the knowledge sought for nursing practice because they are not questioned due to their long existence and frequent support by authorities. Many traditions are not tested for accuracy and efficiency. It contributes to stagnation and ritualization of practice.

**Authority:** Authority (experts) is also known and refers to persons with specialised expertise; they are experienced and have power in their field. They can influence opinion and behaviour in their environment when discussing issues that relate to their field of study.

They are important because not everyone is able to become experts in every problem; hence having experts in a particular field of study makes it easy for learning and acquisition of knowledge. There are, however, disadvantages when one is dealing with more than one expert. A statement of one authority may be contradicted or refuted by another, thereby confusing persons that do not have knowledge in that field of study. In addition, some authorities are fallible, especially if their knowledge is based on personal experiences.

**Personal experience:** This involves gaining knowledge by being personally involved in an event, situation, or circumstance. One's experience represents one's familiar and functional source of knowledge. It is usually easier to perform a task the second time than the first. Personal experience helps an individual to gain skills and expertise; however, an individual's experience may be restricted to making a valid generalisation because it is usually subjective and can be biased.

**Logical reasoning:** This is the process of organising ideas to reach conclusions. One can think through a problem using a process of either induction or deduction or both.

Inductive reasoning is the process of developing generalisations from specific observations. Knowledge arrived at is highly dependent on the representativeness of the specific example, whereas deductive reasoning is the process of developing specific observations from general principles.

Deductive reasoning can lead to an erroneous conclusion since the validity of the reasoning is dependent upon the truth of the general premise on which the

prediction is based. This can result in the misjudgement of the situation. Nevertheless, both deductive and inductive reasoning are important in knowledge acquisition.

Logical reasoning enables people to make sense of both their thoughts and experiences to arrive at what we call logical conclusions; however, reasoning alone does not give enough basis for evaluating the accuracy of a phenomenon.

**Trial and Error:** This is informal experimentation. A process of tackling problems by successively trying out alternative solutions to find out which solution would best solve the problem. For instance, a researcher encounters a problem, attempts an intervention, and if the intervention works, it is adopted, and if not, other interventions are tried until a suitable solution is attained.

The advantage is that knowledge is gained from experience. There are, however, some disadvantages to trial and error, as it involves no documentation of effective and ineffective actions. Knowledge gained is not shared with others in most situations. It is often fallible and insufficient and tends to be haphazard and might not be possible to repeat. Additionally, it can be time-consuming because sometimes multiple interventions must be performed before one is found to be effective. Performing multiple interventions might not be suitable in healthcare settings since there is a risk in implementing healthcare actions that may be detrimental to patients' health.

**Intuition:** This is the insight or understanding of a situation or event that usually cannot be logically explained (gut feeling). This happens when one acquires a sudden insight that arises without one's conscious reasoning.

For instance, a person wakes up in the middle of the night with a creative answer to a problem that he/she has spent days trying to solve. Intuition usually will occur because of deep knowledge. The usage is problematic as it usually would defile a logical explanation and cannot be put to an empirical test.

### **The Scientific Method**

The best way to acquire knowledge is by using the scientific method. The scientific method is a methodical approach employed by scientists and researchers to examine natural occurrences, generate new knowledge, and enhance current understanding. It depends on empirical evidence, analytical reasoning, and logical deduction. However, there is no absolute truth in science.

What is referred to today as knowledge is provisional and based on the best available current understanding in the field. Since science is changing, before one embarks on a new research project, the researcher needs to ascertain the currently held views of the chosen topic as well as the accepted methods of investigations. The scientific method of inquiry is not only an essential element of research, but it is also generally considered to be the most sophisticated and reliable way of acquiring knowledge.

It represents the application of a scientific approach to the study of the question of interest. It involves the controlled, systematic investigation that is rooted in objective reality with the aim to develop general knowledge about a natural phenomenon.

The scientific method is made up of many components, four of which are briefly described. These are usually referred to as strategies that make up the scientific method. In every scientific method, these strategies ought to be present.

*Order and systematization:* The investigator progresses logically through a series of steps, according to a prescribed plan of action.

*Control:* There is an imposition of conditions on the study situation so that biases are minimised and precision validity is maximized.

*Empirical evidence:* The process is rooted in objective reality and gathered directly or indirectly through the human senses.

*Generalisation:* There should be the ability to go beyond the specifics of the situation inherent in the scientific method to suggest implications in other populations with same parameters and characteristics.

The purpose of the scientific method is usually meant to describe, explore, explain, predict, and control. The scientific method is not, however, without its limitations because there is no method used by humans without a limitation. Some limitations that confront the scientific methods include:

**Moral and ethical issues:** There are restrictions with regards to morals and ethical issues. There are issues that might be considered scientifically appropriate yet morally or ethically wrong. In these situations, limitations are posed and may include, but are not limited to, constraints on rights of living organisms and its inability to answer moral and ethical issues. It is not all human characteristics that can be adequately measured; for instance, pain, self-

confidence, aggression, and so on vary from one individual to another and might pose some limitations in their accurate measurement.

**Human complexity:** The individuality of a man or man's uniqueness is another issue that thwarts the scientific method. Every person has his or her own uniqueness and places a premium on different things. For instance, where you feel cold, someone else might say the weather is fine or even complain of the heat. Human complexity, such as uniqueness in personality, differences in social environment, differences in values, and differences in lifestyle, sometimes poses challenges in measurement using the scientific method.

**General limitations:** Every research study has some limitations. These may not be specific and may run across the procedures and the strategies of the enquiry. Table 1.1 presents a comparison between the scientific method and the alternative methods.

**Table 1.1 Comparison of the scientific and the alternative methods**

<b>The scientific method</b>	<b>Alternative methods</b>
Uses empirical enquiry	May accept fanciful explanation
Uses a systematic approach	May use haphazard and unsystematic approaches
Makes empirical data public	Are frequently not recorded or documented
Uses control and objectivity	Makes little or no attempts to control variables
strives for the development of conceptual explanations or theories	Select evidence from personal experience or performance
Strives for generalisability	Often focus on isolated events
Tends not to deal with metaphysical explanations that cannot be empirically tested	May be highly metaphysical or spiritual in some cases

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Uses tested reasoning

Are frequently based on rituals

## **Basic Foundations of Research Knowledge**

There are always benefits to spending time to lay a strong foundation before building. Spending time to build and gain the necessary concepts needed for a project might appear as time-wasting, but when the project starts, the time you spent understanding the basic structure would pay off. Research is a compulsory course for graduate and undergraduate students, and the time spent to understand the basic components will profit the reader soon.

Spend some time reading through some fundamental terminologies used in research. These terminologies are not exhaustive, as more concepts continue to develop and are being included in the literature for usage.

This chapter discusses the definition of research, the research process, sources of knowledge acquisition, scientific methods, comparisons of scientific and alternative methods and some basic research terminologies.

### **Definition of research**

There are several definitions in literature that elucidate clearly what research, few of these are considered Research is a systematic investigation or enquiry aimed at contributing to the knowledge of a theory or topic (D. Polit & C. Beck, 2017).

Research is also considered as a systematic process of collecting, analysing, and interpreting information to increase our understanding of phenomena of interest (Leedy & Ormrod, 2010).

Research can also be defined as a diligent, systematic enquiry to validate and refine existing knowledge and generate new knowledge (Grove et al., 2013).

Considering these definitions, a key phrase that is intuitively clear is searching again. One can therefore liberally say that research means “to search again.”

Again, considering the definition, one can identify some basic characteristics that are common to these and in most definitions of research.

The outcome is usually to **increase knowledge** in a way that will contribute to an existing body of knowledge of a particular discipline or profession,

depending on the type of research that is pursued. The aim of research in the health sciences is to provide robust evidence on which the practice of quality care can hinge.

Research would usually start with a **question or a problem**.

A problem that requires a solution or question needing an answer. There should be at least one method through which this question can be answered or information available to solve the problem, be it through search, discovery, or inquiry. Mostly there is no readily available or generally accepted evidence that answers the question; if there is, then research may not be relevant.

The search is usually **systematic and diligent**; it involves planning, organisation and persistence. It is done in an orderly manner, according to a predetermined logical structure, and tries to minimise the results being influenced by faults in apparatus or the methodology or even the researcher's expectations.

**It is a process** and not a single-stage performance. This means there should be a purpose, a series of actions (objectives), and a goal. The purpose gives direction and impetus to the process, and the sequence of activities is organised into steps to achieve the identified goals. Research is a planned process and not a haphazard series of actions carried out by individuals or groups.

### **Research as Process**

From the sample definitions, research is a process for collecting, analysing and interpreting information to answer questions. However, to qualify as research, the process must have specific principles. These principles must, as far as possible, be controlled, rigorous, systematic, valid and verifiable, empirical, and critical.

**Controlled:** In real life, there are many factors that affect the outcome of a situation (phenomenon). For this reason, it is necessary to control other factors that might affect the outcome of the research. The thought of control means that, in exploring causality in relation to two variables, you set up your study in a way that minimises the effects of other factors affecting the relationship.

**Rigorous:** The researcher must be scrupulous in ensuring that the procedures followed to find answers to questions are relevant, appropriate, and justified. However, the degree of rigour varies markedly between the physical and the social sciences and within the social sciences. Different methods or techniques might be used to ensure and maintain rigour depending on the approach of research used (qualitative or quantitative).

**Systematic:** This is a principle of the research process that refers to the procedures adopted to undertake an investigation such that it follows a certain logical sequence. The different steps cannot be taken in a haphazard way. Some procedures must follow others. In other words, it is a designed step-by-step process that would usually not allow skipping steps.

**Valid and Verifiable:** This concept implies that whatever the researcher concludes based on the findings is correct and can be verified by the researcher and other researchers. There should be a way to go through similar processes and procedures to arrive at a similar output and approximately identical findings.

**Empirical:** For the principle of empirics, the researcher must ensure that any conclusions drawn are based upon hard evidence gathered from information collected from real-life experiences or observations. Conclusions should not be baseless but should be traceable to the results of the research.

**Critical:** A critical examination of the procedures used, and the methods employed is crucial to a research inquiry. The process of investigation must be trustworthy and free from any drawbacks. The process adopted and the procedures used must be able to withstand critical scrutiny. For a process to be called research, it is imperative that it has the principles discussed.

**Table 1.2 Terminologies used in research**

Terminology	Meaning

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