

RESEARCH METHODOLOGY: A COMPREHENSIVE STUDY OF THEORETICAL AND PRACTICAL APPROACHES

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Abstract

Research methodology is a systematic approach used to explain, analyze, and solve a research problem. It involves not only identifying the appropriate research methods and techniques but also understanding the rationale behind their selection and application. Researchers must comprehend various statistical tools such as mean, mode, chi-square, and confidence indices, and determine their relevance and significance to the specific problem at hand. Moreover, methodology involves evaluating the assumptions underlying different techniques and selecting those most suitable to the nature of the research. A clear understanding of both qualitative and quantitative research approaches is essential. Effective research methodology ensures that the investigation is logically structured, scientifically grounded, and tailored to the unique characteristics of the problem being studied. Therefore, researchers must carefully design and align their methodology with the research objectives, as it plays a critical role in ensuring the validity, reliability, and credibility of the research outcomes.

INTRODUCTION

Research, in universal terms, refers to a diligent and systematic search for knowledge or information. It is often understood as a purposeful inquiry aimed at discovering, interpreting, and revising facts, events, behaviors, or theories. Essentially, research is both an art and a science of exploration—an organized effort to answer specific questions, solve problems, or gain a deeper understanding of a particular phenomenon. The higher learner's glossary of current English defines research as "a watchful investigation, especially through search for new particulars in any branch of information." Similarly; redman and moray describe it as a "systematized effort to gain new knowledge." These definitions emphasize the

structured and deliberate nature of research, which distinguishes it from casual information gathering. At the heart of any research lies the concept of methodology. Methodology refers to the theoretical and systematic analysis of the methods applied within a given field. It not only involves the selection and application of techniques but also encompasses the logic and rationale behind their use. Methodology includes various components such as research models, sampling techniques, phases of investigation, and either quantitative or qualitative approaches. Through these tools, researchers are able to construct and validate knowledge that is reliable and reproducible.

Research methodology, more specifically, is the scientific study of how research is conducted. It provides a framework for collecting, analyzing, and interpreting data in a way that is both logical and objective. It involves a structured process of inquiry that includes the formulation of a research problem, the selection of appropriate tools and techniques, and the careful analysis of results. Moreover, research methodology offers insights into the strengths and limitations of different methods, enabling researchers to make informed decisions about their use.

Understanding research methodology is crucial not only for interpreting the outcomes of scientific investigations but also for appreciating the process by which knowledge is constructed. It helps uncover the assumptions, constraints, and ethical considerations involved in research and links theoretical approaches to practical applications. By doing so, it expands the boundaries of knowledge and pushes forward the "frontiers of information." in this way; research methodology serves as a foundational pillar for academic inquiry and professional practice across diverse disciplines.

Objectives of research

The principal aim of research is to seek answers to questions through the systematic application of scientific methods. At its core, research endeavors to uncover truths that are currently unknown, hidden, or unverified. It represents a structured effort to explore reality, deepen understanding, and expand the existing body of knowledge. While each research study is unique in its purpose and focus, the broader objectives of research can generally be categorized into several key areas.

Research methodology is more of a policy for formulating a study design, its viewpoint with rationales. Thus, the theory of study methodology may be translated as decision- deriving concerning the whole essential requirement for a study. Study methodology involves decision deriving about the study issue, design, and procedure. "Methodology is termed in at least two dimensions. In one, methodology is similar to a study model engaged by a scientist in a specific project, including fundamental knowledge concerned to the subject and study methods under observations and the framework

working in a specific context" (Sarantakos, 1998, 33). Therefore, every research has a unique methodology, and every scientist works with his or her methodology, that might differ from research to research. Following definition, it seems that there could be as many methodologies as there are studies, since most studies are distinct in scenery and approaches. Different Social researchers have explained the social study in variety of possible ways.

Importance of Research

Research holds a pivotal role in the progress and development of individuals, institutions, governments, and society at large. It is a systematic tool for uncovering truths, generating new knowledge, and solving real-world problems. The significance of research can be highlighted through the following key points:

Policy Formulation and Implementation:

Research plays a fundamental role in shaping and framing government policies. Almost all policy decisions—including annual and monthly budgets, economic strategies, and social reforms—are informed by extensive research. Government bodies often rely on research organizations and think tanks for data analysis, trend forecasting, and policy recommendations to ensure informed decision-making.

Advancement of Knowledge:

The primary aim of research is to gain and expand knowledge. It helps generate new ideas, verify or refute existing facts, and replace outdated information. By doing so, research contributes to intellectual growth and the refinement of academic disciplines.

Application in Business and Trade Organizations:

In the corporate sector, research is essential for strategic planning and decision-making. Companies engage researchers to study market trends, consumer behavior, and organizational performance. It aids in areas such as asset budgeting, taxation strategies, cost optimization, and forecasting. Research ensures competitiveness and adaptability in a dynamic business environment.

Discovery and Innovation:

Through research, unknown theories are explored, and hidden facts are brought to light. It drives innovation and creativity, providing researchers with the opportunity to delve deep into subjects and introduce new concepts, models, or technologies. This, in turn, benefits society through the development of new solutions and services.

Elimination of Myths, Superstitions, and Prejudices:

Research is a rational process that replaces superstition and baseless beliefs with evidence-based understanding. Many outdated social norms, misconceptions, and prejudices have been challenged and corrected through the findings of rigorous research.

Promotion of Social Development:

Research contributes to the evolution of society by addressing social issues, improving education, health systems, economic planning, and cultural awareness. It enhances civic consciousness and collective well being.

Academic Value for Scholars:

Research is indispensable for students, particularly those pursuing higher education such as M.Phil. or Ph.D. degrees. It forms the foundation of thesis writing and scholarly inquiry, enabling students to contribute meaningfully to their fields of study.

Types of Research

Research can be categorized based on various factors such as time, purpose, setting, location, and methodology. While different researchers may adopt slightly varied classifications, all types of research hold their own unique significance and contribute meaningfully to the development of knowledge.

After the assortment and formulation of the study, problem usage has to be decided with the type of study design to be pursued. It is constitution of the entire process by which we tend to attain more knowledge of distinctive problem feature of the society. Therefore, many study models have been established and employed by several social scientists, some being distinct (Sarantakos, 1998, 6). The varied

experiences and usage of social study are shown in the following evocative table:

1.Basic research	2.Quantitative research	3.Applied research	4.Longitudinal research	5.Qualitative research
6.Descriptive research	7.Classification research	8.Comparative research	9.Exploratory research	10.Explanatory research
11.Causal research	12.Theory-testing research	13.Theory-building research	14.Action research (walsh, 2006, 14)	

The researcher has chosen the multiple study types mainly the exploratory study, qualitative and quantitative types for his research. This research design is employed. The researcher is not familiar with the problem or the community he is willing to study. Therefore, it aims to achieve acquaintance with the issue, or circumstances or the community not known earlier. It supports in finding of ideas and insight that supports in understanding and processing a problem for the generation of hypothesis and for its more accurate examination.

Basic research

Also known as pure or fundamental research, this type of research is primarily concerned with the advancement of theoretical knowledge. Its main objective is to uncover truths, develop new theories, or expand existing frameworks, without necessarily aiming for immediate practical applications. Basic research is focused on generalizations and the formulation of abstract principles. While it may not solve current problems directly, it provides a strong foundation for future applied research and innovation. Its importance lies in its contribution to the systematic body of scientific knowledge.

Applied research

Applied research, often referred to as practical or need-based research, is designed to solve specific, real-world problems. It is typically conducted with the intent of addressing pressing issues in institutions, industries, governments, or society at large. For example, research on economic fluctuations, social behaviors, or environmental challenges falls under this category. Applied research often utilizes secondary data and focuses on producing actionable outcomes, making it highly relevant for policy-making and strategic planning.

Empirical research

Empirical research, also known as experimental research, relies on direct or indirect observation and experience. It involves the collection and analysis of primary data to draw conclusions or test hypotheses. In empirical research, the investigator begins with a working hypothesis, designs experiments or surveys, and systematically tests the assumptions. This form of research is especially valuable for validating theories and establishing cause-and-effect relationships through measurable evidence.

Qualitative research

Qualitative research is primarily concerned with understanding human behavior, attitudes, emotions, and motivations. It explores the how and why behind phenomena rather than quantifying them. This type of research often involves methods such as interviews, focus groups, observation, word association tests, sentence completion, or projective techniques like the Matic apperception test (tat). It is especially useful in fields like psychology, sociology, and anthropology, and is often referred to as motivation research due to its focus on underlying psychological factors.

Quantitative research

Quantitative research emphasizes the measurement of variables in numerical terms. It involves collecting data that can be quantified and analyzed statistically. This approach is commonly used in studies involving surveys, censuses, and experiments where patterns, trends, or relationships can be examined using mathematical models. Quantitative research is ideal for testing theories, making predictions, and analyzing population-level data.

Descriptive research

Descriptive research aims to provide a precise and detailed account of the subject under study. This may involve observing behaviors, recording demographic patterns, or documenting specific phenomena. Descriptive research does not investigate causality but rather seeks to provide a clear picture of what exists.

Diagnostic research

To determine the frequency with which something occurs or its relationship with other variables known as diagnostic research, this objective involves identifying the underlying causes or conditions that relate to a particular event or phenomenon. It seeks to answer questions such as “why is this happening?” or “what factors are associated with this outcome?”

Hypothesis research

To test a hypothesis of a causal relationship between variables hypothesis-testing research is focused on validating or refuting a proposed relationship between variables. It uses statistical tools and experimental designs to examine whether changes in one variable are responsible for changes in another. This type of research is fundamental to theory building and scientific advancement.

Exploratory research

It is elastic sufficiently to allow the contemplation of many viewpoints of phenomena. Thus, is greatly instructed. In other study design, we start with specific hypothesis, which we intend to testify, but in exploratory research generation of hypothesis come at the end. Exploratory study often ends up with generation of distinct schematic research project.

Most recurrently, exploratory researches are carried out when there is not adequate data about the subject and, thus, the formulation of hypotheses and the operationalization of the questions are tricky or even not possible. More in particular investigation is undertaken for the following motives (Sarantakos, 1998, 128). Viability in the first place, examination will show whether research on the problem in question is reasonable, feasible and worthwhile.

This type of research seeks to explore a subject or problem for the first time, often when there is limited existing information available. Known as exploratory or formulate research, its goal is to develop new perspectives, generate ideas, or lay the groundwork for future, more detailed investigations.

Universe

The space from where the pertinent data is accessible called the “Universe”. The term universe and population are exchangeable. In simple words, a population or universe can be termed as any

anthology persons or subjects, events of interests. A population is the “aggregate of all cases that conform to some selected set of specifications.” For example, by the specification’s “people” and “residing in Britain,” we define a population consisting of all people who reside in Britain.” (Frankfort, 1994, 170) In this present research “Central Prison Karachi” is selected as universe and the “convicted prisoners” are taken as subjects. Therefore, 700 under observation subjects of Central Prison Karachi is our universe.

Sampling

Sampling is the terms to a systematic method of selection. In social research, it is used to select subjects to be studied. The reason for sampling is to expand the representatives of the subject’s studies. (Baker, 1994).

Sample Size

It is a sub unit of the universe or population that possesses all the characteristics of the general population. “When the data are fractional and used to make generalization on the whole, the subset is called a sample.” (Frankfort, 1994, 171) In the present study, 700 convicted prisoners of Karachi city are taken as universe and the sample size is constituted of 301 respondents, which is 43% of the universe.

Methods of Sampling

The sampling problem occurs in link with the method of securing a representative sample. The vital prerequisite of any sample is that it be representative as likely of the population from which it is drawn. Sampling methods may be classified into two types. (Frankfort, 1994, 174)

1. Probability sampling, 2. non-probability sampling. The best method of sampling is probability sampling; for the reason it increases the probability of achieving samples that are best representing population thus, the researcher has chosen the probability type of sampling in this research. Probability samples are chosen in a way as to be representative of the population. They supply the most applicable and credible results because they replicate the characteristics of the population from which they are extracted (e.g., residents of a specific community, students at an elementary school, etc.).

There may be two types of probability samples: random and stratified (Frankfort, 1994, 175). In this research, the researcher has applied the simple random sampling method. The term random has a very accurate meaning. Each individual in the population of interest has an equal probability of being selected. The assumption of an equal possibility of selection terms that sources such as a telephone directory or voter registration lists are not sufficient for providing a random sample of a community. In both these situations there will be a mix of residents whose names are possibly not listed. Telephonic surveys get around this problem by random-digit dialing ~ but that supposes that every individual in the population has a telephone connection and a number. The key to random selection is that there are no favors involved in the selection of the sample. Any disparity between the sample characteristics and the population characteristics is only depends on a chance. (Frankfort, 1994, 175)

Methods of Data Collection

There are three methods for collecting data in social research.

- Interview.
- Questionnaire.
- Observation.

In this research the researcher has applied interview schedule method for collecting the data. Interviews are based on a strict procedure and a highly structured interview guide, which is no different from a questionnaire. A structured interview is in reality a questionnaire read by the interviewer as prescribed by the researcher. This rigid structure determines the operation of this research instrument and allows no freedom to make adjustments to any of its elements, such as content, wording or order of the questions. (Sarantakos, 1998, 247). The most decisive stage of study design is the analysis and interpretation of data. After the data have been gathered, the social scientist teams give full consideration to their analysis and interpretation, a process consisting of a number of closely related functions. “The preparatory work for the initial levels of the study is put into practice during the level of data collection, which itself generates meaningful and relevant information. In general terms, such

data will be represented in the form of ticks, circles or other notations on the response sheets, or in piles of pages full of text and other information it is the task of the researcher to study this data and search for trends, patterns and connections that are relevant to the study question. The objective of this function is to make meaning out of the data gathered through the earlier levels of the study, and to identify the information the data contain. The tick, circles and other notations are interpreted into statement, propositions or conclusions, which eventually will answer the study problem. And the pages of text will need to be transformed to a form that will communicate the thematic message hidden within the lines and paragraph. This procedure of data processing and of transforming raw data into worthy statement is called analysis and interpretation of data (Sarantakos, 1998, 313)". For the purpose of data analysis, bivariate tables were formed according to the hypotheses. The current research was designed to generate a standard an original measure of family adjustment of males. Few histories from different studies related to parenting methods, as well as the impact of family bonding upon the males enables the scientists to suggest measuring levels of adjustment of males in their families. (gul seema, 2008, 21) To choose valid entities, the mock consisting of 70 fields was generated to relate factor analysis. Eventually, 14 fields loading below .30 were omitted and leftover 56 fields were regained on the measurement. (gul seema, 2008, 26) To identify the dimensions and categorization of the factors, the context of the fields with loading of .30 and above on a single factor has been determined in details. It was found that fields having loading of .3 on a single factor were repetitive in the content. So, it could altogether be grouped indicating specific dimension of family adjustment scale. in this, 25 fields were overlapped i.e. the content of these fields were related to other factors. (gul seema, 2008, 31) Divergent validity is reflected by a positive correlation between index of family terms and family adjustment scale and its subscales. All coefficients of correlations were very high ($r \geq .882$). Other validation processes that was method of contrasting groups, item-total correlation and correlation between subscales and total scores also gains supporting evidence of the construction validity of new measurement. (gul seema, 2008, 32)

The rules of the scale were expressed in terms of percentiles, which were not only easily comprehended but also have universal validity. This family scale would surely be useful for the appraisal of males' family adjustment. The scale will also be very beneficial in educating and counseling student who requires psychological assistance will be given this scale to view how far their issues can be attributed to their family environment. Since the scale proved to be highly reliable and valid it will be beneficial for short listing and further studies. (gul seema, 2008, 34) Bivariate table of selected variables were created and Chi Square was used on these later.

Ethical Consideration in Data Collection

Respondents were interviewed after obtaining their consent and their privacy issues were well considered. No certain psychological or environmental pressure were visibly exerted, while the consent not be shared was declared clearly. After the data collection, the researcher uses pretesting as the method of verifying the data.

Pre testing

"Pre testing is in essence a trial-and-error procedure, where in the successful trial are reported and errors are ignored the interview schedule is sent to the final group. "Pretests are small element of the research instrument and are predominantly used to check eventual 'mechanical' problems of these instruments". (Sarantakos, 1998, 292) in fact pre-testing is the method of reasoning mistakes, not required information, and difficult interview schedule included in the data collection, instruments before it is actually managed to the respondents. In the present study the researcher administered 15 interviews schedule for pre-testing, which helped improving the interview schedule. After the pretesting, researcher coded the responses for further analyzing the relationship between certain variables.

Coding

Later with collection of data, a researcher has to face with the issue of coding. "Coding is a symbol or character that is easily identifiable elements of the text; coding consists of assisting codes to the collected elements". (Frankfort, 1994, 321). Through coding the data is relocated into symbols and their

symbols or numerical can be tabulated and counted. In the present study, the researcher has adopted this method of coding like a,b,c,d. After the coding, researcher formulated tabulation to reflect the variance of responses.

Tabulation

Coding procedure leads the researchers usually next to do the tabulation; it is an orderly assortment of data in columns and rows. Tables are the most common method of presenting data and usually contain wide rages of information. They enable the researcher to gain an overall view of the findings, to identify trends and to display relationship between elements of findings. (Sarantakos, 1998, 245) The researcher has tabulated the responses in order to proceed for data analysis and interpretation. After the tabulation, researcher started analyzing the descriptive statistics of the responses by corroborating the univariate tables.

Statistical Methods of Analysis

Analysis of the gathered data is a key task for the researcher. The data has been firstly represented in simple and compound table showing frequencies and percentages distribution. The researcher has used the statistical of analysis in order to check the connection between the variables of hypotheses. There are several methods of statistical analysis that may be implied by social researcher to find out the dependability and viability of the data and to study connections between the variables. In the present study, the method of chi-square has been used to test the possible relationship. The chi-square test is a very general test that can be used whenever we wish to evaluate whether or not frequencies, which has been empirically achieved, differ significantly from those which would be expected under a certain set of theoretical propositions.

The Chi-square Test

In 1975 Chi-square test was introduced by Helmert and re defined autonomously later in 1990 by Karl Parson. In this study, chi-square test was used to test the significance of variances between the distribution predictable under the hypothesis of independence and the distribution actually observed Chi-square is defined as “It is a measure of the compatibility

between practically achieved frequencies of an event or property and a theoretical frequency anticipated on the basis of an assumed distribution for this purpose we set up level of significant what point the hypothetical universe mean of no charge will be discarded. (Kumar, 2002, 244).

$$\chi^2 = \sum \frac{(fo - fe)^2}{fe}$$

whereas,

χ^2 = Chi-Square
 fo = Observed or actual frequency
 fe = Expected frequency
 \sum = Sum total of

Therefore, Chi-Square is the sum of the chi-square contingencies in contingency table. In Chi-Square several variables can be tested for their significance.

Degree of Freedom

To figure the value of chi-square from a contingency table, the existence of connected in the universe must be known. So that knowing can use the table, the degree of freedom is as follows. (Kumar, 2002, 231)

$$DF = (C-1)(R-1)$$

C = Total number of columns of contingency table.
 R = Total numbers of rows of contingency table.

Conclusion

Research methodology forms the backbone of any systematic inquiry. It provides the tools, techniques, and frameworks necessary to conduct research in a scientific, objective, and reliable manner. By guiding the researcher through a structured process—starting from the identification of a problem, formulation of hypotheses, designing the research framework, collecting and analyzing data, to drawing valid conclusions—it ensures that the research is logical, credible, and meaningful.

A sound research methodology not only helps in uncovering new knowledge but also allows for the replication and validation of findings by others. It aids in minimizing bias, enhancing accuracy, and ensuring the relevance of the results to real-world problems. Whether the purpose of the study is

exploratory, descriptive, diagnostic, or hypothesis testing, the choice and execution of appropriate methodologies determine the success and value of the research.

Moreover, research methodology contributes to intellectual growth by fostering critical thinking, analytical skills, and academic rigor. It enables scholars, professionals, and policymakers to make informed decisions, challenge assumptions, and generate solutions to complex issues.

In essence, a deep understanding of research methodology is vital for anyone engaged in academic or applied research. It not only shapes the quality of the study but also influences the impact and applicability of its outcomes in society, business, science, and governance. As the world continues to evolve, robust research methodologies remain essential in driving innovation, knowledge creation, and sustainable development.

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