



Research Methodology

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ECON-203A

BS-4 Year | Punjab University Outline

UNIVERSITY OF THE PUNJAB LAHORE

Outline

BS-4 Year Program | **Research-I Code-203A**

Defining the Research Problem

Defining a research problem, Selecting the problem, Techniques involved in defining a problem.

Problem Identification

Defining the area of interest, the relationship between theory and method, what makes a problem/ topic interesting? What is researchable? Feasibility...The 'so what?!' factor the value of simplicity.

Research Questions

General and specific research questions, Developing research questions in different situations, Role of research questions.

Research Design

Meaning of research design, need for research design, Features of a good research design, Important concepts related to research design, Different research designs, Basic principles of experimental designs.

Elements of Research Design

Units of analysis, variables, Relationships, Statistically significant relationship, Research purpose and research design, Qualitative research design, Quantitative research design.

Research Method

Overview of research methods, Quantitative (multivariate) methods, Qualitative (interpretive) methods, using available data, Multi-method and applied research methods.

Research Ethics

Plagiarism, Treatment of human subjects, making ethical decisions, Uses of research: Science and society.

Proposal Writing

How to draft a quality research proposal?

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UNIT NO.1: INTRODUCTION TO RESEARCH METHODS:

Research can be defined as a systematic and scientific investigation aimed at discovering, interpreting, and expanding knowledge through the study of various phenomena, events, or problems.

Here are definitions of research from some famous authors:

1. Kerlinger and Lee (2000) define research as "the systematic, controlled, empirical, and critical investigation of hypothetical propositions about the presumed relations among natural phenomena."

Reference: Kerlinger, F. N., & Lee, H. B. (2000). Foundations of Behavioral Research (4th ed.). Wadsworth Publishing.

2. William Zikmund (2013) defines research as "a process of inquiry that leads to the production of knowledge."

Reference: Zikmund, W. G. (2013). Business Research Methods (9th ed.). South-Western College Pub.

3. C.R. Kothari (2004) describes research as "a scientific and systematic search for pertinent information on a specific topic."

Reference: Kothari, C. R. (2004). Research Methodology: Methods and Techniques (2nd ed.). New Age International.

5. Earl Babbie (2015) describes research as "a systematic inquiry to describe, explain, predict, and control the observed phenomenon."

Reference: Babbie, E. R. (2015). The Practice of Social Research (14th ed.). Cengage Learning.

Why study Research Methods?

Studying Research Methods is essential for several reasons:

- 1) **Conducting Effective Research:** Research methods provide the necessary tools and techniques to conduct research in a systematic and organized manner. By understanding different research methodologies, data collection techniques, and analysis methods, researchers can ensure the validity and reliability of their findings.
- 2) **Generating Reliable Knowledge:** Research methods help in producing reliable and valid knowledge. By following rigorous procedures and employing appropriate methodologies, researchers can ensure that their findings are credible and can be trusted by the academic and scientific community.
- 3) **Developing Critical Thinking Skills:** Research methods encourage critical thinking and problem-solving. Researchers learn to formulate research questions, evaluate existing literature, and analyze data objectively, which enhances their analytical abilities.
- 4) **Making Informed Decisions:** In various fields, decision-making is often based on research findings. By studying research methods, individuals can assess the quality and significance of research studies, which helps in making well-informed decisions in both academic and practical contexts.
- 5) **Advancing Knowledge:** Research is the foundation of progress and knowledge creation. By studying research methods, individuals can contribute to the existing body of knowledge in their field of study and push the boundaries of understanding.
- 6) **Enhancing Professional Skills:** Research methods are valuable skills in many professions, such as academia, business, healthcare, social work, and more. Individuals equipped with research skills are better equipped to excel in their careers and contribute meaningfully to their respective fields.
- 7) **Supporting Evidence-Based Practices:** In fields like medicine, education, and psychology, evidence-based practices are crucial for effective outcomes. Research methods enable

professionals to base their decisions and interventions on solid empirical evidence rather than intuition or unsupported assumptions.

- 8) **Evaluating Research:** Studying research methods allows individuals to critically evaluate and assess the quality of existing research studies. This skill is essential in understanding the strengths and limitations of research findings.
- 9) **Fostering Innovation:** Research methods enable individuals to investigate new ideas and explore innovative solutions to existing problems. The systematic approach of research encourages creativity and fosters innovation in various fields.
- 10) **Engaging in Lifelong Learning:** Research methods introduce individuals to a continuous process of learning and discovery. Researchers constantly update their knowledge, adapt to new methodologies, and stay informed about the latest developments in their field.

1. Aims and Objectives of Research:

- Research aims to explore, investigate, and analyze various phenomena or problems to gain new knowledge and understanding.
- Objectives of research refer to the specific goals that researchers set out to achieve through their study.
- Aims are the broader intentions of the research, while objectives are the concrete and measurable steps to accomplish those aims.
- The objectives of research are specific, measurable, and achievable goals that researchers aim to accomplish through their study.
- These objectives help in guiding the research process and provide a clear direction for data collection, analysis, and interpretation.

2. Central Issues of Research:

- The central issues of research revolve around the formulation of research questions or hypotheses.
- Researchers must define the scope and focus of their study to address the specific problems or topics they aim to investigate.
- Identifying the central issues helps in narrowing down the research focus and guides the overall research process.

3. Descriptive Analysis:

- Descriptive analysis is a research method used to describe and summarize data or information in a meaningful way.
- It involves organizing and presenting data in the form of tables, charts, graphs, or numerical measures to provide a clear picture of the research findings.
- Descriptive analysis is often the initial step in research, helping to identify patterns and trends.

4. Meaning of Research:

- Research refers to the systematic and organized investigation of a subject or problem to establish facts, reach conclusions, and make new discoveries.
- It involves collecting, analyzing, and interpreting data to generate knowledge and answer specific research questions.

5. Types of Research:

Research can be broadly classified into two main types: qualitative and quantitative research.

- a) Qualitative research focuses on understanding and interpreting the underlying meanings and motivations behind a particular phenomenon.
- b) Quantitative research involves the use of numerical data and statistical analysis to quantify relationships and patterns.

6. Research Approaches:

Research approaches refer to the overall strategies or plans adopted by researchers to conduct their studies. Common research approaches include deductive (from theory to data) and inductive (from data to theory) approaches.

The choice of approach depends on the research questions, available data, and the nature of the study.

- a) **The Deductive Approach:** The deductive approach involves testing a specific hypothesis or theory by collecting and analyzing data to see if the hypothesis or theory is supported or not. It

follows top-down logic, starting with a general theory or hypothesis and then moving towards specific observations and data collection to confirm or refute the initial proposition.

Here are the key characteristics and steps of the deductive approach:

1. Theory or Hypothesis: The deductive approach begins with an existing theory or hypothesis, which is derived from previous research, existing literature, or established principles in the field of study.

2. Formulating Research Questions: Based on the theory or hypothesis, specific research questions are formulated. These questions guide the research process and data collection.

3. Data Collection: Researchers gather empirical data through various methods, such as surveys, experiments, or observations, to test the proposed hypotheses or answer the research questions.

4. Data Analysis: The collected data is then analyzed using statistical or other relevant methods to determine whether the results support or contradict the initial theory or hypothesis.

5. Drawing Conclusions: Based on the analysis of the data, researchers draw conclusions about the validity of the original theory or hypothesis. If the data supports the hypothesis, it provides evidence in favor of the theory. Conversely, if the data contradicts the hypothesis, researchers may need to reconsider the theory or propose new explanations.

6. Generalization: If the data supports the hypothesis, the findings can be generalized to a broader population or context, contributing to the body of knowledge in the field.

The deductive approach is commonly associated with quantitative research, where researchers aim to test hypotheses with numerical data and statistical analysis. It is used in various scientific disciplines, including psychology, sociology, economics, and natural sciences.

b) The Inductive Approach: In the inductive approach, researchers move from specific observations and data to broader generalizations and theories. It involves generating theories or hypotheses based on the analysis of specific instances or empirical evidence.

Key characteristics of the inductive approach:

1. Data Collection: In the inductive approach, researchers first collect specific data through observations, interviews, surveys, experiments, or other empirical methods. The data can be qualitative or quantitative in nature.

2. Pattern Recognition: After collecting the data, researchers analyze it to identify patterns, trends, or recurring themes. They look for commonalities or regularities in the data.

3. Theory Building: Based on the patterns and observations from the data, researchers develop tentative theories or hypotheses. These theories are specific to the data collected but may have broader implications.

4. Generalization: The inductive approach allows researchers to generalize the findings from the specific data to form broader theories or principles. However, these generalizations are not as strong as those produced through deductive reasoning.

5. Bottom-up Approach: The inductive approach is often described as a "bottom-up" approach since it starts with specific data and moves upward towards developing theories or concepts.

6. Creative and Exploratory: Inductive reasoning is more exploratory and creative as it allows researchers to discover new ideas and concepts that might not have been apparent at the outset.

7. Iterative Process: The process of data collection, analysis, and theory building in the inductive approach can be iterative. Researchers may revisit the data to refine or modify their theories based on new insights.

Inductive reasoning is commonly used in qualitative research methods, such as ethnography, grounded theory, content analysis, and case studies. It is especially valuable when researchers aim

to explore new areas, generate hypotheses for further investigation, or gain an in-depth understanding of complex phenomena.

One of the main advantages of the deductive approach is its structured and systematic nature, allowing researchers to test specific hypotheses rigorously. However, a potential limitation is that it relies heavily on pre-existing theories or hypotheses, which may limit exploration of new or unexpected findings.

7. Research Methods Versus Research Methodology:

- Research methods refer to the specific techniques or tools used to gather and analyze data, such as surveys, experiments, interviews, etc.
- Research methodology encompasses the overall framework and theoretical underpinning of the research, including the choice of methods, data collection, and data analysis techniques.

Research Methods	Research Methodology
The specific techniques that are used to collect and analyze data.	The overall plan for a research project, including the research methods that will be used.
Can be quantitative, qualitative, or mixed methods.	Is more general and encompasses the research methods, the research design, and the data analysis plan.
Is typically focused on a specific research question or hypothesis.	Is more holistic and considers the overall research process.
Is often used in conjunction with research methodology.	Is essential for any research project.

Characteristic	Research Methods	Research Methodology
Focus	Specific techniques for collecting and analyzing data	Overall plan for a research project
Scope	Narrow	Broad
Level of detail	Specific	General
Use	Typically used in conjunction with research methodology	Essential for any research project

8. Research and Scientific Methods:

Research	Scientific Methods
A systematic investigation of a topic or issue.	A process of objectively establishing facts through testing and experimentation.
Can be quantitative, qualitative, or mixed methods.	Uses a variety of methods, including observation, experimentation, and hypothesis testing.
Is typically focused on a specific research question or hypothesis.	Is more holistic and considers the overall research process.
Is often used in conjunction with research methodology.	Is essential for any scientific research project.

Characteristic	Research	Scientific Methods
Focus	Specific techniques for collecting and analyzing data	Overall plan for a research project
Scope	Narrow	Broad
Level of detail	Specific	General
Use	Typically used in conjunction with research methodology	Essential for any scientific research project

9. Research Process:

- The research process consists of a series of steps undertaken to conduct a research study systematically.

- It typically involves identifying the research problem, reviewing literature, formulating research questions, choosing appropriate methods, collecting and analyzing data, drawing conclusions, and presenting findings.

The step-wise research process outlines the systematic sequence of activities involved in conducting a research study. It provides a structured framework that researchers can follow to ensure the successful completion of their research. While the specific steps may vary depending on the research design and field of study, a general step-wise research process typically includes the following stages:

1. Identify the Research Problem: The first step is to identify a clear and well-defined research problem or topic of interest. Researchers need to articulate the purpose of the study and formulate research questions or objectives that they aim to address.

2. Conduct a Literature Review: Before proceeding with the research, researchers review existing literature relevant to the research topic. The literature review helps them gain a comprehensive understanding of the current state of knowledge, identify gaps, and build a theoretical foundation for the study.

3. Formulate Research Design and Methodology: Based on the research questions and objectives, researchers choose an appropriate research design and methodology. This involves deciding whether the study will be qualitative, quantitative, or a mix of both, and selecting the data collection methods and analysis techniques.

4. Develop Research Instruments: Researchers design and develop the necessary research instruments, such as surveys, questionnaires, interview guides, or observation protocols, based on the chosen methodology.

5. Collect Data: In this stage, researchers collect data from the selected sample or population using the research instruments they have developed. Data collection can involve various methods, such as surveys, interviews, experiments, or observations.

6. Analyze Data: Once the data is collected, researchers analyze it using appropriate statistical or qualitative analysis methods. Data analysis helps in drawing meaningful insights and identifying patterns or relationships in the data.

7. Interpretation of Results: After analyzing the data, researchers interpret the findings in the context of the research questions and objectives. They explain the implications of their results and discuss their significance.

8. Draw Conclusions: Based on the analysis and interpretation, researchers draw conclusions that address the research questions and objectives. Conclusions should be supported by evidence from the data.

9. Discuss Limitations: Researchers acknowledge and discuss any limitations or shortcomings of their study. This helps in understanding the scope and potential biases of the research.

10. Make Recommendations: If applicable, researchers may provide practical recommendations based on their research findings. These recommendations can inform future actions or decisions related to the research topic.

11. Write the Research Report: Researchers compile all the information and findings into a well-structured research report or manuscript. The research report includes an introduction, literature review, methodology, results, discussion, conclusions, and references.

12. Present and Disseminate Findings: Researchers present their research findings through conferences, seminars, or other academic forums. They may also publish their research in academic journals to contribute to the existing body of knowledge in their field.

The step-wise research process is iterative, meaning that researchers may need to revisit certain stages or refine their approach based on new insights or findings. Following a systematic research process enhances the quality and credibility of the research study.

Unit 2: Research Problem:

What is a Research Problem:

A research problem is a specific and clearly stated issue or question that requires investigation, analysis, and resolution through a systematic research process.

Defining a Research Problem:

- Defining a research problem involves identifying a gap in knowledge, a contradiction in existing theories, or a practical issue that needs to be addressed.
- Researchers need to carefully articulate the problem to ensure clarity and specificity.
- The problem statement should be concise and free from ambiguity so that it can be effectively communicated to others.

Selecting the Problem:

- a) The process of selecting a research problem requires consideration of personal interests, academic relevance, feasibility, and significance of the issue.
- b) Researchers should choose a problem that aligns with their area of expertise and passion to maintain motivation throughout the research process.
- c) The problem should also contribute to the existing body of knowledge and offer potential benefits to society or a particular field.

JOHARI WINDOW (John, Harry and Richard) Model:

The best ways for determination of real problem for research may be suggested as:

- 1) Discussing the problem with colleagues, experts, tutors etc
- 2) Identification through review of literature.
- 3) Assessing/ Measuring the validity of the problem through the use of Johari Window below:

Knowledge	I Know	I Don't Know
You Know	"Clear"	"Research"
You Don't Know	"Education"	"Dark"

Techniques / Source Involved in Defining a Problem-Source:

- 1. Literature Review:** Conducting a thorough review of existing literature helps identify gaps in knowledge and areas where further research is needed.
- 2. Brainstorming:** Engaging in brainstorming sessions with colleagues, mentors, or team members can generate ideas and potential research questions.
- 3. Observation and Experience:** Researchers may draw inspiration from their own observations and experiences, noticing specific problems that need to be addressed.

4. Stakeholder Consultation: Talking to experts, practitioners, or individuals directly affected by the issue can provide valuable insights and help frame the research problem more effectively.

5. Problem Identification Frameworks: There are certain problem identification frameworks, like the "5 Whys" technique, which involve asking iterative "why" questions to delve deeper into the root cause of an issue.

6. Surveys and Questionnaires: Gathering data through surveys or questionnaires can help identify prevalent issues or challenges that can be potential research problems.

7. Analyzing Research Gaps: Analyzing the gaps in existing studies can reveal areas where further investigation is warranted.

8. Delphi Method: This technique involves obtaining feedback from a panel of experts in multiple rounds to arrive at a consensus on the research problem.

9. SWOT Analysis: Conducting a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis can help identify areas that need improvement or further exploration.

10. Problem Tree Analysis: This graphical tool helps visualize the causes and effects of a problem, leading to a clear understanding of the research problem's context.

Certainly! Research problems can be categorized into different types based on their nature and characteristics. Here are two types of research problems:

Types of R.P:

1) Phenomenal Research Problem:

- a. Phenomenal research problems are focused on understanding and describing the state of nature or specific phenomena as they naturally occur.
- b. The primary objective of this type of research problem is to observe, document, and analyze the characteristics, behaviors, or patterns of a particular phenomenon without any intervention or manipulation.
- c. Researchers conducting phenomenal research seek to gain insights into the underlying nature of the subject under investigation.
- d. Examples of phenomenal research problems could include studying the migratory patterns of birds, analyzing the behavior of consumers in a shopping mall, or investigating the effects of climate change on a specific ecosystem.

2) Hypothetical Research Problem:

- a. Hypothetical research problems are centered around exploring and establishing relationships between variables or factors.
- b. These research problems are designed to test hypotheses or research questions and investigate causal or correlational links between different variables.
- c. Researchers use this type of research problem to examine whether changes in one variable lead to changes in another, or to identify associations between different factors.
- d. Hypothetical research problems often involve experimental or quasi-experimental designs to manipulate variables and assess their impact on the outcome.

UNIT 3: PROBLEM IDENTIFICATION:

Problem identification is the process of recognizing and defining a specific issue, challenge, or gap in knowledge that needs to be addressed through research. It involves carefully examining the current state of affairs, reviewing existing literature, consulting with stakeholders, and analyzing data to determine the most relevant and meaningful research problems.

Defining the Area of Interest:

Defining the area of interest involves narrowing down a broad subject or topic to a specific and manageable research focus. Researchers must determine the boundaries and scope of their study, considering factors such as available resources, time constraints, and the significance of the chosen area.

The Relationship between Theory and Method:

Here is a sheet that shows the relationship between theory and method:

Theory:

- a. A set of interrelated concepts, definitions, and propositions that explain a phenomenon.
- b. Provides a framework for understanding and interpreting the world.
- c. Can be used to generate hypotheses and make predictions.

Method:

- a. A systematic way of gathering and analyzing data.
- b. Provides a way to test theories and hypotheses.
- c. Can be qualitative or quantitative.

Relationship between Theory and Method:

- a. Theory and method are closely interrelated.
- b. Theory guides the choice of method.
- c. Method is used to test theories and hypotheses.
- d. The results of research can lead to the development of new theories.

Example

Let's say we are interested in studying the relationship between social class and educational attainment. We might start by developing a theory about how social class affects educational opportunities. This theory might suggest that children from lower-class families are more likely to attend under-resourced schools, which could limit their educational opportunities.

To test this theory, we would need to choose a research method. We might decide to conduct a quantitative study, in which we would collect data on the educational attainment of people from different social classes. We could then use statistical analysis to see if there is a statistically significant relationship between social class and educational attainment.

The results of our study could either support or refute our theory. If the results support our theory, then we have evidence that social class does indeed affect educational opportunities. If the results refute our theory, then we need to revise our theory or develop a new one.

What Makes a Problem/Topic Interesting?

A problem or topic becomes interesting when it meets certain criteria:

- 1. Relevance:** The problem is significant and has practical implications in a particular domain or for a specific group of people.
- 2. Novelty:** It addresses a new or underexplored aspect of a subject, adding to the existing body of knowledge.
- 3. Impact:** Solving the problem can lead to positive outcomes, improvements, or advancements in theory, practice, or policy.
- 4. Controversy:** The topic is debatable or contested, leading to diverse viewpoints and discussions.
- 5. Timeliness:** The problem is relevant to current issues, trends, or concerns.

6. Practical Applicability: The research findings can be applied to real-world situations and have tangible benefits.

What is Researchable? Feasibility:

A research problem is considered researchable if it can be effectively investigated and studied within practical limitations such as time, budget, and available resources. Feasibility refers to the likelihood that the research can be successfully conducted and completed within these limitations.

Factors of Value of Simplicity:

The value of simplicity in research refers to the idea that simpler explanations or models are often preferred over more complex ones when they sufficiently explain the observed phenomena. Occam's Razor, a philosophical principle, suggests that among competing hypotheses, the one with the fewest assumptions should be selected. Simple research designs, concepts, and explanations are easier to understand, implement, and communicate. However, it is essential to strike a balance between simplicity and accuracy, as some research questions may require more intricate approaches.



UNIT 4: RESEARCH QUESTIONS:

Research questions are specific inquiries or queries that a researcher aims to address through a research study. They guide the entire research process, from the formulation of the study's objectives to data collection, analysis, and interpretation. Research questions are designed to be clear, concise, and focused, leading to a well-defined investigation.

General and Specific Research Questions:

General Research Questions: These are broad and overarching questions that provide a high-level perspective of the research topic. General research questions help set the direction of the study and are typically broad in scope. They often serve as starting points for more specific inquiries.

Example: "What are the factors influencing consumer purchasing behavior?"

Specific Research Questions: These questions are narrower in scope and delve into specific aspects of the research topic. Specific research questions are more detailed and precise, allowing for focused investigation and data collection.

Example: "How does the price sensitivity of consumers vary across different income levels?"

Developing Research Questions in Different Situations-Kinds of Research:

The process of developing research questions can vary depending on the research context and objectives:

1. Exploratory Research: In exploratory research, where the topic is relatively unexplored, the focus may be on general research questions to gain a broad understanding of the subject. As the study progresses and more information is gathered, specific research questions can be developed.

2. Descriptive Research: For descriptive research, which aims to provide a detailed account of a phenomenon, both general and specific research questions can be formulated. General questions set the context, while specific questions delve into the details.

3. Causal Research: Causal research aims to establish cause-and-effect relationships. Developing research questions in causal research often involves hypothesis testing, with specific questions addressing the relationships between variables.

4. Comparative Research: In comparative research, questions are focused on comparing two or more groups, situations, or variables. Both general and specific questions can be employed to understand the differences or similarities between the groups being studied.

5. Qualitative Research: In qualitative research, research questions are open-ended and allow for in-depth exploration of experiences, perceptions, and attitudes. These questions are designed to elicit rich and descriptive data.

6. Quantitative Research: Quantitative research requires specific research questions that can be tested using statistical analyses. These questions are often structured with clearly defined variables.

Role of Research Questions:

1. Focus and Direction: Research questions provide clarity and focus to the study, helping researchers stay on track and avoid wandering off-topic.

2. Guide Methodology: Research questions dictate the choice of research design, data collection methods, and analysis techniques.

3. Motivate the Study: Engaging and relevant research questions generate interest in the study, both among researchers and potential participants.

4. Evaluation and Conclusion: Research questions act as a basis for evaluating the research findings and drawing meaningful conclusions.

5. Contribution to Knowledge: By addressing research questions, a study contributes to the existing body of knowledge and potentially opens new avenues for future research.

6. Communication: Research questions are essential in presenting the purpose and scope of the study to the academic community and stakeholders.



UNIT 5: RESEARCH DESIGN:

Research design refers to the overall plan or strategy that a researcher employs to conduct a study. It outlines the methods, procedures, and techniques to be used in gathering and analyzing data, as well as the logical reasoning behind those choices. It involves making important decisions about the study's scope, data collection methods, data analysis techniques, and the overall structure of the study. In essence, research design provides a blueprint for how the research study will be carried out.

Need for Research Design:

A research design is essential for several reasons:

- Clarity of Purpose:** It helps clarify the objectives and research questions, ensuring that the study stays focused and meaningful.
- Validity:** A well-designed research study enhances the validity of the results, making the findings more accurate and reliable.
- Efficiency:** A proper design streamlines the research process, optimizing the use of resources like time, money, and effort.
- Reproducibility:** A well-documented research design enables other researchers to replicate the study and verify the results.
- Ethical Considerations:** A research design should address ethical concerns, safeguarding the rights and well-being of study participants.

Features of a Good Research Design:

A good research design should possess the following features:

- Clear Research Objectives:** The design should have well-defined and specific research questions or hypotheses.
- Appropriate Data Collection Methods:** The methods chosen should be suitable for addressing the research questions.
- Sample Selection:** The sampling method should be appropriate and representative of the target population.
- Control of Variables:** A good design identifies and controls potential confounding variables that could influence the results.
- Data Analysis Plan:** The design should outline how the data will be analyzed to answer the research questions.
- Practicality:** The design should be feasible, considering available resources and constraints.

Important Concepts Related to Research Design:

- Dependent and Independent Variables:** The dependent variable is the outcome or response being measured, while the independent variable is the factor being manipulated or studied.
- Control Group:** In experimental research, the control group serves as a comparison to the experimental group and does not receive the treatment or intervention.
- Randomization:** The process of assigning participants to different groups or conditions randomly to minimize bias.
- Sample Size:** The number of participants or observations in a study, which affects the study's statistical power and generalizability.
- Quantitative vs. Qualitative Research:** Research designs can be broadly categorized as quantitative (dealing with numerical data and statistical analysis) or qualitative (exploring in-depth insights and meanings).

Feature	Quantitative Research	Qualitative Research
Data type	Numerical	Non-numerical
Data collection methods	Surveys, experiments, observations and secondary data analysis	Interviews, focus groups, participant observation
Data analysis methods	Statistical analysis and hypothesis testing.	Content and thematic Interpretative analysis.
Strengths	Can be used to test hypotheses,	Can provide rich insights into human

	generalize findings, and make predictions. Precise, generalizable, and objective.	behavior and experiences. In-depth, rich, and subjective
Weaknesses	Can be limited in its ability to capture complex human experiences, can be insensitive to context, and can be difficult to generalize findings. Can be superficial, lacks depth, and can be biased	Can be time-consuming and labor-intensive, can be difficult to analyze data, and can be difficult to make generalizations. Can be time-consuming, difficult to generalize, and can be difficult to analyze
Purpose	To test hypotheses and to measure the size and strength of relationships between variables	To understand the meaning of people's experiences and to explore the complexities of social phenomena

Different Research Designs:

- a) **Experimental Design:** Involves manipulating one or more independent variables to observe their effects on a dependent variable. It allows researchers to establish cause-and-effect relationships.
- b) **Observational Design:** Researchers observe and record behaviors without intervening or manipulating variables. It is often used in naturalistic settings.
- c) **Cross-Sectional Design:** Data is collected from a sample at a single point in time, providing a snapshot view of a population.
- d) **Longitudinal Design:** Data is collected from the same sample over an extended period, allowing researchers to study changes and developments over time.
- e) **Case Study Design:** An in-depth analysis of a single individual, group, or phenomenon.
- f) **Survey Design:** Involves administering questionnaires or interviews to gather data from a sample of participants.

Basic Principles of Experimental Designs:

- a. **Randomization:** Randomly assigning participants to different groups or conditions helps minimize selection bias and ensures groups are comparable.
- b. **Control:** Controlling extraneous variables helps isolate the effects of the independent variable on the dependent variable.
- c. **Replication:** Repetition of the experiment with different samples enhances the generalizability and reliability of the findings.
- d. **Manipulation:** The independent variable should be manipulated to assess its causal effect on the dependent variable.
- e. **Random Assignment:** Each participant should have an equal chance of being assigned to any group or condition, reducing bias and increasing the validity of the results.

Detail:

Experimental designs in research are structured to investigate cause-and-effect relationships between variables. The basic principles of experimental designs are as follows:

1. Randomization:

Randomization involves the random assignment of participants to different groups or conditions in the study. This process ensures that each participant has an equal chance of being assigned to any group, reducing the likelihood of bias and making the groups comparable at the start of the experiment. Randomization helps control for confounding variables and increases the internal validity of the study.

2. Control:

Control is the process of managing extraneous variables that could influence the dependent variable. In experimental designs, researchers aim to hold all variables constant except for the independent variable, which is being manipulated. By controlling extraneous variables, the researcher can attribute any observed changes in the dependent variable to the manipulation of the independent variable.

3. Manipulation:

In experimental research, the independent variable is deliberately manipulated to observe its effect on the dependent variable. The independent variable represents the factor that researchers

believe will cause changes in the dependent variable. By manipulating the independent variable, researchers can test causal relationships and draw conclusions about cause and effect.

4. Independent and Dependent Variables:

Experimental designs involve the identification of both independent and dependent variables. The independent variable is the variable that the researcher manipulates, while the dependent variable is the outcome or response that is measured. The researcher assesses how changes in the independent variable affect the dependent variable.

5. Replication:

Replication involves repeating the experiment with different participants or under different conditions. By replicating the study, researchers can assess the consistency and reliability of the findings. Replication helps establish the robustness of the results and increases confidence in the validity of the conclusions.

6. Pretesting and Post testing:

In experimental designs, researchers often conduct pretests to assess the initial status of participants before the manipulation of the independent variable. After the experiment, posttests are administered to measure the effects of the manipulation. By comparing pretest and posttest scores, researchers can determine the impact of the independent variable on the dependent variable.

7. Experimental and Control Groups:

Experimental designs typically involve two or more groups: the experimental group(s) and the control group. The experimental group receives the manipulation or treatment, while the control group does not. The control group provides a baseline for comparison, allowing researchers to determine if any changes in the experimental group can be attributed to the treatment.

UNIT 6: ELEMENTS OF RESEARCH DESIGN:

The elements of research design are the essential components that make up the overall plan or structure of a research study. These elements guide the process of data collection, analysis, and interpretation. The key elements include the research purpose, research questions or hypotheses, variables, units of analysis, data collection methods, and data analysis techniques.

2. Units of Analysis:

Units of analysis refer to the entities or subjects that are the focus of the research study. They can be individuals, groups, organizations, countries, or any other defined entities. The choice of units of analysis depends on the research questions and objectives.

3. Variables:

Variables are characteristics or properties that can vary and are measured or manipulated in a research study. In quantitative research, variables are typically numerical, while in qualitative research, they can be categorical or thematic. Variables can be independent (manipulated) or dependent (outcomes measured).

4. Relationships (of variables):

In research, relationships refer to the associations or connections between variables. Researchers investigate how changes in one variable may be related to changes in another variable. Relationships can be positive (both variables increase or decrease together), negative (one variable increases while the other decreases), or null (no significant relationship).

5. Statistically Significant Relationship:

A statistically significant relationship indicates that the association between variables is unlikely to have occurred by chance. When analyzing data, researchers use statistical tests to determine if the observed relationship between variables is significant. If a relationship is statistically significant, it suggests that the observed effect is likely due to the independent variable's manipulation.

6. Research Purpose and Research Design:

The research purpose defines the overall goal of the study, the reason for conducting the research, and the desired outcomes. It sets the direction for the entire research process. The research design, on the other hand, outlines the specific approach and methodology that will be used to achieve the research purpose. It includes decisions about data collection methods, sampling techniques, and data analysis procedures.

7. Qualitative Research Design:

Qualitative research design involves exploring and understanding phenomena in-depth, usually by collecting non-numerical data such as interviews, observations, or textual analysis. The emphasis is on gaining insights, understanding meanings, and exploring complex social interactions. Qualitative research designs often use small samples, and the analysis is more interpretive and subjective.

The key characteristics of qualitative research design are as follows:

1. Exploration and Understanding: Qualitative research aims to explore and understand complex phenomena in-depth. It seeks to uncover the meanings, experiences, and perspectives of participants within their natural context.

2. Subjective and Interpretive: Qualitative research is subjective in nature, as it involves the researcher's interpretation of the data. Researchers engage in the process of making sense of the data and understanding the participants' viewpoints.

3. Flexible and Iterative: Qualitative research design is flexible and allows for adaptations during the study. Researchers may refine research questions, data collection methods, or analysis techniques as they gain new insights from the data.

4. Data Collection through Direct Interaction: Qualitative data are typically collected through direct interactions with participants. Common methods include interviews, focus groups, observations, and document analysis.

5. Small and Purposeful Samples: Qualitative research often uses small and purposeful samples. Participants are selected based on their relevance to the research questions and their ability to provide rich and insightful data.

6. Non-Numerical Data: Qualitative research deals with non-numerical data, such as narratives, text, images, and audio. The data are descriptive and expressed in words, rather than numerical values.

7. Inductive Approach: Qualitative research adopts an inductive approach, where theories and hypotheses emerge from the data rather than being imposed before data collection.

8. Detailed and Contextual Findings: Qualitative research generates detailed and contextual findings. Researchers explore the complexities and unique aspects of the phenomenon being studied, allowing for a deeper understanding.

9. Emergent Design: In some cases, qualitative research design may emerge as the study progresses. Researchers may adapt their design based on the evolving nature of the research process.

10. Triangulation: Qualitative researchers often use multiple data sources, methods, or researchers to enhance the credibility and validity of their findings through triangulation.

11. Emphasis on Validity and Trustworthiness: Qualitative research emphasizes the importance of validity and trustworthiness to ensure the rigor and credibility of the study. Researchers may employ techniques like member checking, peer debriefing, and maintaining an audit trail to enhance the research's trustworthiness.

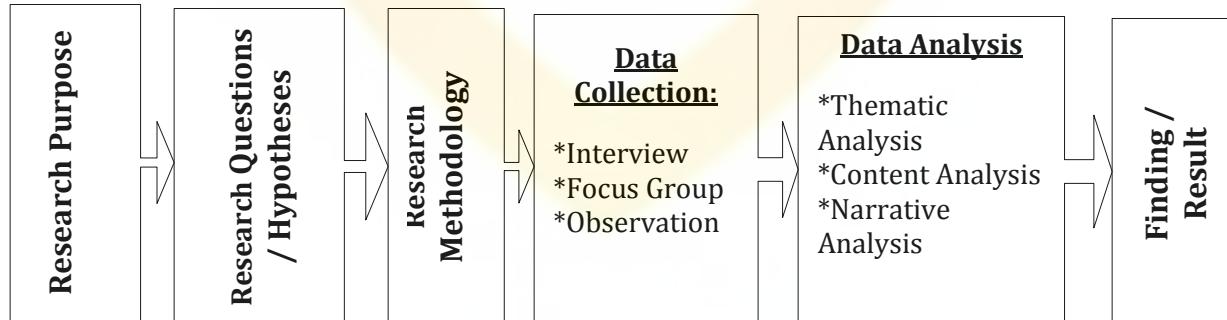
12. Ethical Considerations: Ethical considerations are crucial in qualitative research design. Researchers must ensure the privacy, confidentiality, and informed consent of participants, and they should be mindful of potential power dynamics and the impact of the research on participants.

Overall, qualitative research design provides a holistic and in-depth understanding of the complexities of human behavior, experiences, and social phenomena. The focus on meaning and context allows researchers to explore topics in great detail, making it a valuable approach in numerous fields, including anthropology, sociology, psychology, education, and healthcare.

Diagram of Qualitative Research Design:

Qualitative research design involves a systematic approach to collecting, analyzing, and interpreting non-numerical data to gain in-depth insights and understand the complexities of a particular phenomenon. It is used to explore and understand the meanings, experiences, beliefs, and behaviors of individuals or groups in their natural settings. Qualitative research design typically involves methods like interviews, focus groups, observations, and content analysis.

Below is a simple diagram illustrating the key components of a qualitative research design:



Explanation of Qualitative Research diagram:

1. Research Purpose:

At the core of any research design is the research purpose, which defines the main objective or goal of the study. It sets the direction and focus of the research, guiding the entire process.

2. Research Questions/Hypotheses:

The research questions or hypotheses are specific inquiries that the study seeks to address. They provide a framework for the data collection and analysis, guiding the researcher's exploration of the phenomenon.

3. Methodology:

The methodology outlines the overall approach and plan for conducting the research. It includes decisions about data collection methods, the target population or sample, and the research setting.

4. Data Collection:

Qualitative research uses various data collection methods, such as interviews, focus groups, and observations, to gather rich and detailed information directly from participants in their natural context.

5. Data Analysis:

After collecting the data, researchers engage in data analysis to make sense of the collected information. Qualitative data analysis methods, such as thematic analysis, content analysis, and narrative analysis, are used to identify patterns, themes, and meanings in the data.

- a) **Thematic Analysis:** Thematic analysis is a qualitative research method used to identify and analyze patterns (themes) within textual, visual, or audio data. It involves a systematic process of coding the data and grouping it into meaningful themes that capture the essence of the participants' responses or narratives. Thematic analysis aims to gain a deeper understanding of the meanings and experiences expressed by the participants in a research study.
- b) **Content Analysis:** Content analysis is a research method used to systematically analyze textual, visual, or audio material to identify patterns, themes, or trends within the data. It is typically a quantitative approach that involves counting and categorizing specific words, phrases, or themes present in a large set of data. Content analysis is commonly used in communication studies, media research, and social sciences to examine the content and frequency of certain messages or topics.
- c) **Narrative Analysis:** Narrative analysis is a qualitative research approach focused on understanding the stories or narratives shared by individuals or groups. It involves examining the structure, content, and context of the narratives to uncover the underlying meanings, themes, and cultural aspects embedded within them. Narrative analysis is widely used in disciplines such as psychology, sociology, literature, and anthropology to explore how individuals construct and convey their experiences through storytelling.

6. Findings/Results:

The results of the qualitative research design are presented in the form of rich narratives, themes, or patterns that emerged from the data analysis. These findings provide a deeper understanding of the research questions and contribute to the broader knowledge about the phenomenon under investigation.

8. Quantitative Research Design:

Quantitative research design aims to quantify relationships between variables using numerical data and statistical analysis. It involves structured data collection through surveys, experiments, or existing datasets. The focus is on measuring and analyzing variables to test hypotheses and make generalizations about the population. Quantitative research designs often use large samples to enhance generalizability.

Quantitative research design is a structured and systematic approach used to investigate and analyze relationships, trends, and patterns through the collection and analysis of numerical data. The primary goal of quantitative research is to measure variables, test hypotheses, and make generalizations about a population based on the data obtained from a sample. This type of research design is commonly used in various fields, including social sciences, psychology, economics, and natural sciences.

Key Characteristics of Quantitative Research Design:

1. Clearly Defined Research Questions and Hypotheses: Quantitative research begins with well-defined research questions or hypotheses that the study aims to address. These questions should be specific, measurable, and focused on variables that can be quantified.

2. Objective and Structured Data Collection: Quantitative research involves the collection of numerical data using structured instruments such as surveys, questionnaires, standardized tests, or experimental measurements. The data collection process is designed to be replicable and free from bias.

3. Large and Representative Samples: To ensure the generalizability of findings to a broader population, quantitative studies often use large and representative samples. Random sampling techniques are commonly employed to select participants from the target population.

4. Statistical Analysis: Numerical data collected in quantitative research are subjected to rigorous statistical analysis. Various statistical techniques, such as descriptive statistics, inferential statistics, regression analysis, and t-tests, are used to explore relationships between variables and draw conclusions from the data.

5. Emphasis on Objectivity and Replicability: Quantitative research emphasizes objectivity and aims to produce results that are replicable by other researchers. The use of standardized data collection methods and statistical procedures helps ensure consistency and reproducibility of findings.

6. Control of Variables: In experimental quantitative research, researchers manipulate one or more independent variables to observe their effects on the dependent variable while controlling for other variables. This allows for the establishment of cause-and-effect relationships.

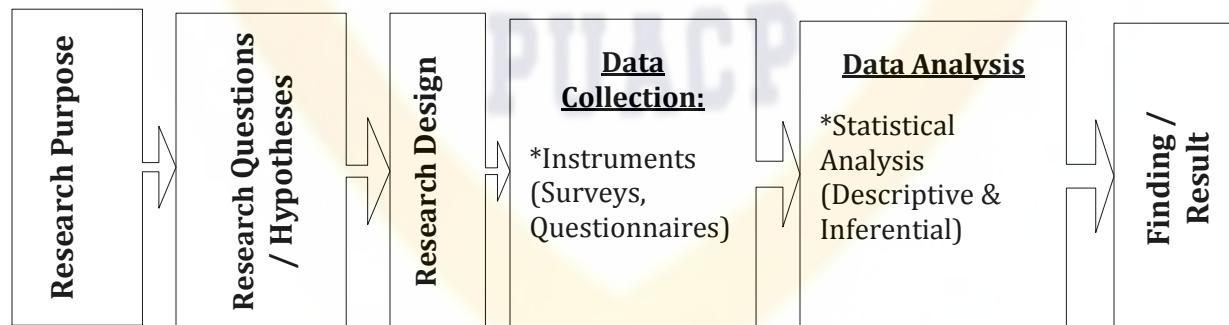
7. Generalizability: Quantitative research design seeks to draw conclusions that can be generalized to the broader population from which the sample was drawn. The goal is to make reliable inferences about the population based on the findings from the sample.

Examples of Quantitative Research Studies:

- A study that examines the relationship between hours of study and academic performance among college students.
- Research investigating the impact of a new drug on blood pressure levels in patients with hypertension.
- Surveys to assess public opinion on a specific social or political issue.
- A market research study that measures consumer preferences for different product features.

Diagram of Quantitative Research:

Below is a simplified diagram of a typical quantitative research design:



Explanation of Quantitative Research Diagram:

1. Research Purpose & Research Questions/Hypotheses:

The research design begins with a clearly defined research purpose and specific research questions or hypotheses that the study aims to address. These research questions or hypotheses guide the entire research process.

2. Research Design:

The research design outlines the overall structure and methodology of the study. It includes decisions about the type of data to be collected, the research setting, the sampling technique, and the data analysis procedures.

3. Data Collection:

In quantitative research, numerical data are collected using structured instruments such as surveys or questionnaires. These instruments are designed to measure specific variables related to the research questions.

- **Instruments (Surveys, Questionnaires):**

Surveys typically involve a set of structured questions administered to a sample of individuals, while **questionnaires** are self-administered written or online forms. These instruments aim to measure specific variables and gather data to test hypotheses, explore relationships, or make generalizations about a population. The use of standardized instruments ensures consistency and comparability of data, making it easier to analyze and draw objective conclusions.

4. Data Analysis:

Once the data is collected, it undergoes statistical analysis. The data analysis involves using various statistical techniques to explore relationships between variables, test hypotheses, and draw conclusions from the data.

- **Statistical Analysis (Descriptive & Inferential):**

Statistical Analysis: Statistical analysis is a crucial component of quantitative research used to organize, summarize, interpret, and draw conclusions from numerical data. It involves the application of various statistical techniques to explore relationships between variables, test hypotheses, and make inferences about populations based on data collected from samples.

a) **Descriptive Statistics:**

Descriptive statistics is a branch of statistical analysis that involves summarizing and presenting the main characteristics of the data. It provides a clear and concise overview of the data set, helping researchers to understand the central tendencies, variability, and distribution of the variables. Common descriptive statistics include measures such as:

- Measures of central tendency: Mean, median, mode
- Measures of variability: Range, standard deviation, variance
- Measures of shape of distribution: Skewness, kurtosis
- Frequency distributions: Histograms, bar charts

Descriptive statistics offer a snapshot view of the data, aiding researchers in identifying patterns, trends, and outliers within the sample.

b) **Inferential Statistics:** Inferential statistics, on the other hand, is used to make inferences and draw conclusions about the larger population based on data obtained from a sample. The goal is to generalize the findings from the sample to the entire population, but it requires a careful consideration of the sampling method and potential sources of bias.

Inferential statistics involve hypothesis testing and estimation. Common techniques in inferential statistics include:

- **Hypothesis testing:** Used to determine if there is a significant difference or relationship between variables. This involves setting up null and alternative hypotheses and conducting tests such as t-tests, ANOVA (Analysis of Variance), and chi-square tests.
- **Confidence intervals:** Provides a range of values within which a population parameter is likely to fall.
- **Regression analysis:** Examines the relationship between a dependent variable and one or more independent variables, allowing researchers to predict outcomes.

Inferential statistics enable researchers to make broader statements about the population based on the sample data, but it is essential to understand the limitations and potential sources of error in the process.

Together, descriptive and inferential statistics form the foundation of quantitative data analysis, enabling researchers to gain meaningful insights, test hypotheses, and make evidence-based conclusions in their research studies.

7. Findings/Results:

The results of the data analysis are presented as findings. These findings are based on the statistical outcomes and provide answers to the research questions or hypotheses.

Overall, the quantitative research design follows a systematic and structured approach to collect numerical data, analyze it using statistical methods, and draw objective and replicable conclusions from the findings. The diagram illustrates the flow of the research process from defining the research purpose to presenting the results of the data analysis.



UNIT 7: RESEARCH METHOD

Research methods refer to the systematic approaches used to gather data, analyze information, and answer research questions or test hypotheses. They form the foundation of the research process and guide the overall study design. Researchers select appropriate methods based on their research objectives, the nature of the research problem, and the type of data needed to address their inquiries effectively.

Overview of Research Methods:

1. Quantitative Research Methods: Quantitative research methods involve the collection and analysis of numerical data. These methods use structured instruments like surveys, questionnaires, or experiments to measure variables and test relationships between them. Statistical analysis is used to draw conclusions and make generalizations about the population.

2. Qualitative Research Methods: Qualitative research methods focus on exploring and understanding phenomena in-depth. They use non-numerical data, such as interviews, focus groups, observations, or textual analysis, to capture the participants' perspectives and experiences in their natural settings.

3. Using Available Data: This research method involves analyzing existing data that was collected for other purposes. Researchers reanalyze the data to answer new research questions or gain additional insights, making use of data from published sources, databases, or archival records.

4. Multi-method Research: Multi-method research combines both quantitative and qualitative approaches in a single study. Researchers use multiple data collection and analysis techniques to gain a comprehensive understanding of the research problem. This approach enhances the validity and triangulation of findings.

5. Applied Research Methods: Applied research focuses on addressing real-world problems and practical issues. It aims to provide useful solutions and actionable recommendations that can be applied in practice. Applied research often involves collaboration with stakeholders and the application of findings to improve specific situations or practices.

Quantitative (Multivariate) Methods:

Quantitative multivariate methods involve the analysis of multiple variables simultaneously to explore complex relationships. These methods are used to study how several independent variables may collectively influence a dependent variable. Common multivariate methods include multiple regression, factor analysis, and structural equation modeling (SEM).

Qualitative (Interpretive) Methods:

Qualitative interpretive methods focus on understanding human experiences, behaviors, and social phenomena in their natural context. These methods emphasize the interpretive role of the researcher in making sense of the data. Qualitative methods include thematic analysis, content analysis, grounded theory, and narrative analysis.

Using Available Data:

Using available data is a research approach where researchers analyze existing data that was collected for other purposes or by other researchers. This method is cost-effective and time-efficient but requires careful consideration of the data's relevance and limitations for answering the new research questions.

Multi-method Research:

Multi-method research involves integrating quantitative and qualitative approaches in a single study. By using multiple methods, researchers can complement each other's strengths and address the limitations of individual approaches. The combination of methods can provide a more comprehensive and nuanced understanding of the research problem.

Applied Research Methods:

Applied research aims to address practical issues and provide solutions to real-world problems. It is often conducted in partnership with organizations, government agencies, or community stakeholders. Applied research is valuable for making data-driven decisions and improving practices in various fields, including education, healthcare, business, and public policy.

UNIT 8: RESEARCH ETHICS

Research ethics refers to the principles, guidelines, and standards that govern the conduct of research involving human subjects or the use of data obtained from human participants. It encompasses the moral considerations and responsibilities of researchers to protect the rights, welfare, and dignity of individuals involved in research and ensure the integrity and credibility of the research process and its outcomes.

1. Plagiarism:

Plagiarism is the act of presenting someone else's ideas, work, or intellectual property as one's own without proper acknowledgment. In research, plagiarism is a serious ethical violation that undermines the integrity of the work and violates academic and professional standards. Researchers must give appropriate credit to the original sources they use and acknowledge the contributions of others to avoid plagiarism.

2. Treatment of Human Subjects:

Research involving human subjects requires careful ethical considerations. Researchers must obtain informed consent from participants, ensuring that they are fully aware of the research's purpose, procedures, risks, and benefits before agreeing to participate. Researchers must also protect participants' confidentiality, privacy, and anonymity. Any potential risks to participants should be minimized, and the research should prioritize their well-being.

3. Making Ethical Decisions:

Making ethical decisions in research involves the thoughtful consideration of moral principles and values to guide the conduct of the study and ensure the protection of participants and the integrity of the research process. Ethical decision-making is an essential aspect of research that upholds the rights, well-being, and dignity of individuals involved in the study and maintains public trust in scientific endeavors.

Key aspects of making ethical decisions in research include:

1. Informed Consent: Researchers must obtain informed consent from participants before their involvement in the study. Informed consent involves providing clear and understandable information about the research purpose, procedures, potential risks, benefits, and the right to withdraw from the study at any time without penalty. Participants must freely and voluntarily agree to participate without coercion.

2. Confidentiality and Anonymity: Researchers must ensure the confidentiality of participants' data, meaning that individual identities are protected, and only authorized personnel have access to the information. Anonymity is maintained when participants' identities are not linked to their responses or data.

3. Minimizing Harm: Ethical researchers take measures to minimize any potential physical, psychological, social, or economic harm to participants. They carefully assess the risks and benefits of the study and take steps to mitigate any adverse effects on the participants.

4. Beneficence: Researchers strive to maximize the benefits of the research while minimizing potential harms. Beneficence involves promoting the well-being and welfare of participants and ensuring that the study serves a valuable purpose.

5. Justice: Researchers must ensure fairness in participant selection and treatment. They should avoid exploiting vulnerable populations and ensure that the benefits and burdens of the research are distributed equitably.

6. Avoiding Deception: Ethical research avoids deceptive practices that may mislead or harm participants. If deception is necessary for the study, researchers must provide debriefing after data collection to clarify any misconceptions and obtain participants' consent for their continued involvement in the study.

7. Data Integrity and Transparency: Researchers must maintain the integrity of the data and accurately represent the research findings. This includes reporting both positive and negative results without bias or manipulation.

8. Ethical Review: Studies involving human subjects often require review and approval by institutional review boards (IRBs) or ethical review committees. These bodies ensure that the research meets ethical standards and complies with legal and regulatory requirements.

9. Respect for Autonomy: Ethical researchers respect the autonomy of participants, allowing them to make decisions about their participation freely. This includes recognizing and accommodating individuals' cultural, religious, and personal values.

10. Continuous Ethical Consideration: Ethical decision-making is an ongoing process throughout the research project. Researchers must be attentive to any emerging ethical issues and be prepared to make adjustments to the study to address these concerns.

By following ethical guidelines and principles, researchers demonstrate their commitment to conducting responsible and respectful research, protecting the rights of participants, and contributing to the advancement of knowledge in an ethical and trustworthy manner.

4. Uses of Research: Science and Society:

Research plays a crucial role in advancing knowledge and understanding in various fields, benefiting both the scientific community and society as a whole. The uses of research can be broadly categorized into its contributions to science and its impact on society.

1. Advancing Knowledge: Research contributes to the expansion of scientific knowledge by generating new information, theories, and insights. It builds on existing research and lays the groundwork for future investigations.

2. Testing Hypotheses: Research allows scientists to test hypotheses and theories. By collecting and analyzing data, researchers can confirm or refute hypotheses, leading to a deeper understanding of natural phenomena.

3. Developing New Technologies: Scientific research often leads to the development of new technologies, innovations, and applications that can improve various aspects of life, from medicine and healthcare to communication and transportation.

4. Enhancing Evidence-Based Decision Making: Research provides empirical evidence that informs evidence-based decision-making in various disciplines. Policymakers, practitioners, and professionals rely on research findings to develop effective strategies and solutions.

5. Peer Review and Validation: Scientific research undergoes peer review, a critical evaluation by experts in the field. This process ensures the quality, validity, and reliability of research before publication, enhancing the credibility of scientific knowledge.

Uses of Research in Society:

1. Improving Healthcare: Research in medicine and healthcare leads to advancements in treatments, medical technologies, and disease prevention. It improves patient outcomes, enhances health systems, and saves lives.

2. Informing Public Policy: Research findings influence public policy decisions at local, national, and international levels. Policymakers rely on evidence-based research to develop laws, regulations, and initiatives that address societal challenges.

3. Addressing Social Issues: Research helps identify and understand social issues, such as poverty, inequality, and discrimination. It informs interventions and programs aimed at addressing these issues and improving the well-being of communities.

4. Enhancing Education: Educational research informs teaching practices, curriculum development, and educational policies. It contributes to the improvement of educational systems and the learning outcomes of students.

5. Promoting Economic Development: Research supports economic growth by identifying opportunities, informing business strategies, and promoting innovation and entrepreneurship.

6. Cultural Preservation: Research in anthropology, history, and cultural studies helps preserve and document cultural heritage, traditions, and indigenous knowledge.

7. Environmental Conservation: Research in environmental science contributes to understanding ecosystems, climate change, and sustainable practices, guiding conservation efforts and promoting environmental stewardship.



UNIT 9: PROPOSAL WRITING:

Proposal writing is the process of preparing a comprehensive document that outlines a research project or an idea with the aim of seeking approval, funding, or support from a relevant organization or institution. Research proposals are common in academic, scientific, and professional settings and serve as a blueprint for the proposed research study. The proposal demonstrates the significance of the research, its objectives, methodology, expected outcomes, and the resources required for its successful completion.

Steps to Draft a Quality Research Proposal:

- 1. Identify the Research Problem and Purpose:** Clearly state the research problem or question you intend to address and articulate the purpose of the study. Explain why the research is important and how it will contribute to the existing knowledge in the field.
- 2. Review Literature:** Conduct a thorough review of relevant literature to understand the current state of knowledge on the topic. Identify gaps, controversies, and areas that need further investigation. This review will help position your research within the existing literature.
- 3. Formulate Research Questions/Hypotheses:** Based on the research problem and literature review, develop specific research questions or hypotheses that the study aims to answer or test. These questions should be clear, focused, and aligned with the research objectives.
- 4. Describe the Research Design:** Explain the research design you plan to use, such as experimental, quasi-experimental, correlational, or qualitative. Justify why this design is the most appropriate for your research objectives.
- 5. Define the Sample and Sampling Techniques:** Specify the target population and the sampling method you will use to select participants for your study. Justify the chosen sample size and explain how it represents the broader population.
- 6. Data Collection Methods:** Describe the data collection methods you will employ, such as surveys, interviews, observations, or archival research. Explain why these methods are suitable for gathering the data needed to address your research questions.
- 7. Data Analysis:** Outline the data analysis techniques you will use to analyze the collected data. Mention any statistical or qualitative analysis methods you plan to apply.
- 8. Ethical Considerations:** Address ethical considerations related to your research, especially if it involves human subjects. Explain how you will obtain informed consent, ensure confidentiality, and minimize any potential risks to participants.
- 9. Budget and Resources:** Provide a detailed budget that outlines the resources required for the research, including personnel, materials, equipment, and travel expenses. If seeking funding, explain how the funds will be used to support the study.
- 10. Timetable:** Create a realistic timetable that outlines the various stages of the research project, from data collection to data analysis and report writing. Ensure that the timeline is achievable and allows for unforeseen delays.
- 11. Expected Outcomes and Significance:** Describe the expected outcomes of the research and how they will contribute to the field. Discuss the potential impact of the research findings on theory, practice, or policy.
- 12. References:** Include a list of all the sources you have cited in your proposal. Follow the appropriate citation style (e.g., APA, MLA) consistently.

Research Proposal

Title

- 1. Introduction**
 - Background and context

- Research problem
- Purpose and objectives
- Significance and contributions

2. Literature Review

- Review of relevant literature
- Identification of gaps
- Theoretical framework

3. Research Questions/Hypotheses

4. Research Design

- Description of research design
- Sampling and participants
- Data collection methods
- Data analysis techniques

5. Ethical Considerations

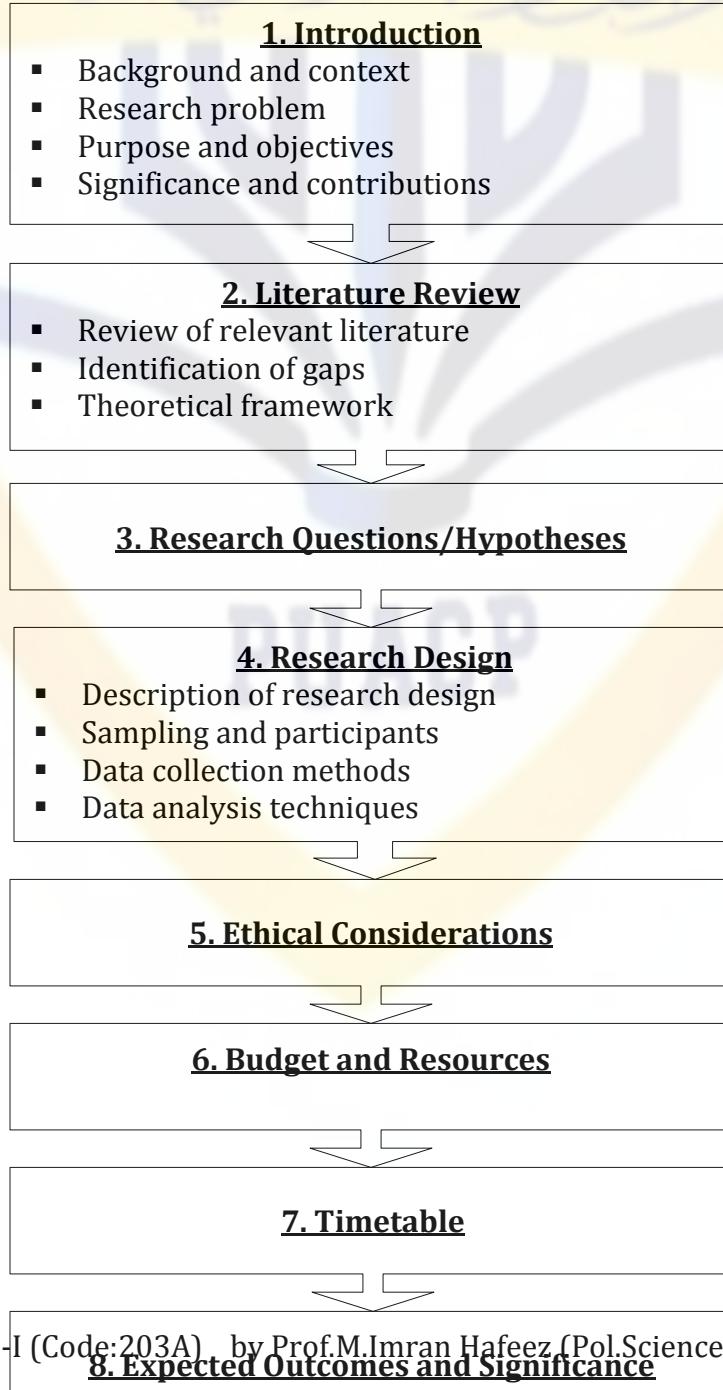
6. Budget and Resources

7. Timetable

8. Expected Outcomes and Significance

9. References

Diagram of Research Proposal:



OUT OF OUTLINE

Basic Definitions

- 1) **Research:** "A systematized effort to gain new knowledge is called research"
- 2) **Research Problem (Question/Obstacle/Difficulty/Discomfort) :** "A valid question needing answer" or "An intellectual stimulus calling for an answer in the form of scientific inquiry"
- 3) **Hypotheses:** "An assumption or proposition whose validity remains to be tested"
- 4) **Documents:** "The record, proof of fact and tools which help in a systematic way to explore the past is called "documents". Material, immaterial and written forms.
- 5) **Data:** "Collection of facts that can be numbers, words, measurements, observations etc. In research data can be primary, secondary, quantitative, raw or classified in every form."
- 6) **Objectivity:** "A state of mind, quality of thinking and ability of a researcher to remain impartial, neutral, unbiased and impersonal during research."
- 7) **Observation:** "It is natural way/technique of data gathering"
- 8) **Research Design:** "It is conceptual structure within which research would be conducted"
- 9) **Research Report:** "It is creative and skillful upshot of a research in written form."
- 10) **Synopsis:** "It is also called research proposal. A very short description of a main theme of a thesis including statement of the problem, research objective, brief literature review, hypothesis, proposed chapterization and a tentative plan for the completion of thesis, research methodology etc as are prescribed by the formatting of institution/university."
- 11) **Plagiarism:** "A specific form of cheating" and "A plagiarist as a kind of thief:- one who steals the thoughts or writing of others and gives them out as his/her own".
- 12) **The definition of a variable:** An image, perception or concept that can be measured – *hence capable of taking on different values-* is called a *variable*.i.e *quality, excellent, prosperous, good, etc*
- 13) **APA Style (Citation):** APA format is the official style of the American Psychological Association and is used in most types of science and social science writing. i.e as under.
- 14) Publication Manual of the American Psychological Association (abbreviated "APA Style") is a style guide that offers academic authors guidance on various subjects for the submission of papers to the publications of APA.
- 15) **Bibliography:**
 1. An alphabetically arranged list of research source utilized in any study is generally called bibliography.
 - b. In practice, separate lists of books, articles, websites, webpages or even tv/radio, discussion, lectures, films and interviews etc are presented in bibliography subject to the employed style of referencing. In APA style, this bibliography is named as references only.

What is Empirical and theoretical Research?

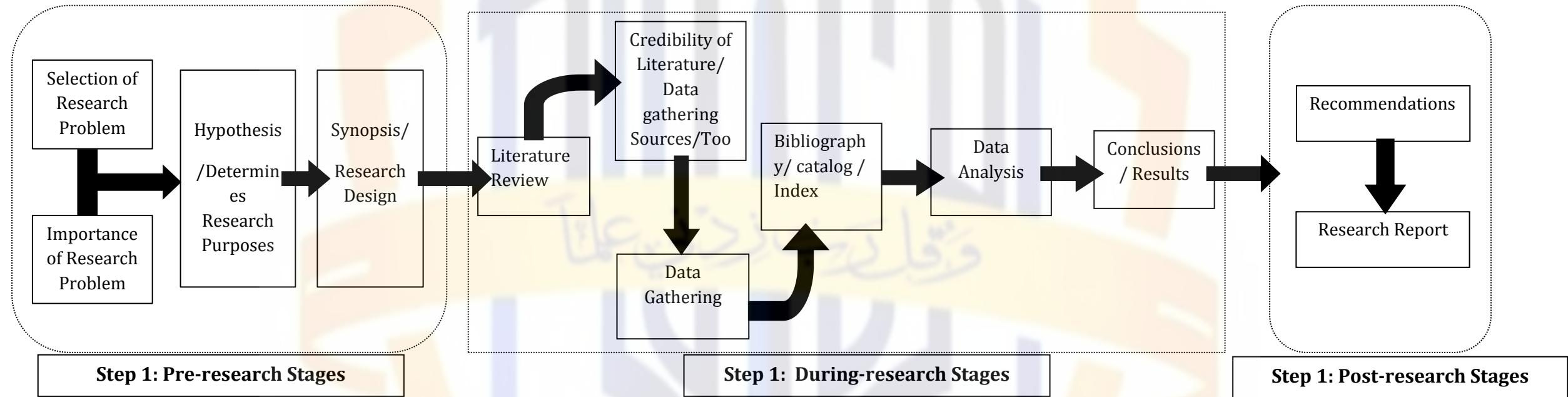
Feature	Empirical Research	Theoretical Research
Data type	Numerical: Data collected from the real world	Conceptual: Ideas and concepts
Purpose	To test hypotheses and make generalizations	To develop new theories and explain phenomena
Methods	Surveys, experiments, questionnaires	Literature review, hypothesis testing, conceptual analysis
Strengths	Objectivity, generalizability, statistical power	Depth of understanding, creativity, innovation, flexibility
Weaknesses	Can be insensitive to context, can oversimplify complex phenomena	Can be biased, can be difficult to test hypotheses

Observation: It is a natural way of collecting data through visualization (Sight), listening (Hearing), smelling, Tasting and touching.

"to denote observation and proposition based on sensory experience and /or derived from such experience by methods of inductive logic, including mathematics and statistics"

Types:

- 1) Participant and Non-Participant
- 2) Control / Un-control
- 3) Structure/Un-structure.

RESEARCH PROCESS:



Hypotheses:

Hypotheses are tentative explanations or predictions based on limited evidence or observations. They are educated guesses that researchers formulate to guide their investigations and experiments. Hypotheses are fundamental to the scientific method and play a crucial role in research and experimentation across various disciplines, including natural sciences, social sciences, and beyond.

In scientific research, a hypothesis typically takes the form of a statement that suggests a relationship between variables or an expected outcome of an experiment. Researchers then test these hypotheses through experiments, observations, or data analysis to determine their validity. Depending on the results of the tests, hypotheses may be accepted, rejected, or modified, leading to a deeper understanding of the phenomenon under study.

Types of Hypotheses:

- 1. Null Hypothesis (H_0):** This hypothesis states that there is no significant relationship between the variables or no effect of the treatment or intervention being tested. Researchers often aim to reject the null hypothesis to support their research hypothesis.
- 2. Alternative Hypothesis (H_1 or H_a):** Also known as the research hypothesis, it represents the statement researchers are trying to support or prove through their experiments or investigations. It suggests that there is a significant relationship between variables or an effect of the treatment or intervention being tested.
- 3. Directional Hypothesis:** This type of hypothesis predicts the direction of the relationship between variables. For example, it may state that "Variable A has a positive effect on Variable B" or "There is a negative relationship between Variable X and Variable Y."
- 4. Non-Directional Hypothesis:** In contrast to directional hypotheses, non-directional hypotheses do not predict the specific direction of the relationship between variables. They only suggest that a relationship exists without specifying its nature.

Importance of Hypotheses:

Hypotheses serve several essential functions in research and the scientific process:

- 1. Guidance:** Hypotheses provide a clear direction for researchers, helping them focus their efforts on specific research questions and outcomes.
- 2. Testability:** Hypotheses are testable statements, which means they can be supported or rejected based on evidence and data, making the research process more rigorous.
- 3. Theory Development:** Hypotheses contribute to the development and refinement of scientific theories by providing empirical support or disconfirmation.
- 4. Logical Structure:** Hypotheses form the logical foundation of experiments and research studies, helping to establish causal relationships between variables.
- 5. Predictive Power:** Well-formulated hypotheses can make predictions about the outcomes of experiments, guiding researchers in designing appropriate procedures and measurements.
- 6. Communication:** Hypotheses allow researchers to communicate their research goals and expectations clearly to the scientific community and the public.

Overall, hypotheses play a vital role in advancing knowledge, promoting critical thinking, and ensuring that scientific investigations are systematic and focused. They are essential tools for driving the scientific method forward and enhancing our understanding of the world around us.



Methods of data collection / Data gathering:

There are two major approaches to gathering information about a situation, person, problem or phenomenon.

- **Primary Sources:** These sources provide first-hand information based on personal effort, using five senses and direct /indirect interaction with object.
- **Secondary Sources:** These sources provide second-hand information based on already available information/documents/data and researcher need to extract and sorted it only.

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