FOUNDATIONS OF EDUCATIONAL RESEARCH

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Contents

COURSE TYPE / NATURE: CORE
COURSE CODE: EDUCC110
Course Title: FOUNDATIONS OF EDUCATIONAL RESEARCH

Marks = 100 (70 + 30)
Course Objectives:
To enable the learners to;
- Understand the Concept, Types and Importance of Educational Research.
- Identify the Problems relating to different Stages of Education
- Identify the Priority Areas in Educational Research.
- Understand the importance of Literature Review in Research.
- Formulate Research Objectives and Hypotheses.
- Understand Concept of Population and Sample
- Understand the Different Methods of Sampling.
- Understand different Tools and Techniques of Collection of Data.
- Understand the Ethical Issues in conducting Educational Research.
- Prepare Research Proposal and Research Report.

INSTRUCTIONS FOR THE PAPER SETTER AND CANDIDATES
The question paper for ESE will carry a total of 70 marks and consist of five sections: A, B, C, D & E. Section A will consist of 6 objective type questions (MCQ, True/False, Completion type) carrying one mark each and 4 short answer type questions carrying 2 marks each which will cover the entire syllabus uniformly. Sections B, C, D & E will have two long answer type questions from the respective Units 1, 2, 3 & 4 of the syllabus & carry 14 marks each. The long answer type questions may contain subparts carrying different marks. The marks for each sub-part and required word limit will be shown against it. Section A of the question paper will be compulsory and the candidates are required to attempt one question (and/or its sub-parts) each from the sections B, C, D and E of the question paper. Answers to short questions should be completed in around 80 to 100 words each. Answers to long answer type question should be completed in around 800 words.

UNIT 1   Introduction to Educational Research
Meaning, Characteristics and Nature of Research. Nature of Educational Research, Significance of Research in Education, Types of Educational Research (Fundamental, Applied and Action Research), Problems relating to Different Stages of Education, Priority Areas in Educational Research.

UNIT 2   Steps of Educational Research
Review of Literature: Purpose & Sources, Selection and Characteristics of Good Research Problem, Variables: Meaning and Types; Objectives: Primary, Secondary and Concomitant, Hypotheses: Meaning, Significance, Types and Formulation.

UNIT 3   Sampling and Tools of Data Collection
Concepts of Population and Sample, Sampling, Sampling Unit, Sampling Frame; Methods of Sampling(Non-Probability and Probability).Characteristics of Good Sample; Errors in Sampling and How to Reduce them. Characteristics of Good Research Tools.Types and Uses of Tools (Questionnaire, Rating Scales, Interview, Attitude Scales).

UNIT 4   Preparation of Research Proposal and Research Report

Ethical Issues in Conducting Educational Research, Skills needed to Design and Conduct Educational Research. Preparation of Research Proposal or Synopsis. Style, Format and Steps of Writing the Research Report; APA Style of Referencing.

Sessional Work / Activities

Marks = 5 (under CCA Component)

A candidate is required to undertake any one of the following activities and submit a detailed report to the concerned teacher / PCP Coordinator. The activity will carry 5 marks:

1. Identification of variables of a research study and their classification in terms of levels of measurement.
2. Reporting of the scoring procedure of the available research tool as per its Manual.
3. Any other activity / activities that the concerned course teacher may think appropriate can be allotted during PCP to the candidates.

Suggested Readings:

Aggarwal.L.P. (2007). Modern Educational Research, Dominant Publishers and Distributers. New Delhi.

Best, John, W., & Kahn James V. (2005). Research in Education", Prentice Hall of India Pvt.Limited, 9th Edition, New Delhi.

Bhandarkar,P.L., Wilkinson,T.S, & Laldas, D.K. (2004).Methodology and Techniques of Social Research,Himalaya Publishing House, Mumbai.

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Creswell, John W. (2014). Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research, Fourth Edition. PHI Learning Private Limited, Delhi.

Kaul, Lokesh (1984).Methodology of Educational Research, Vikas Publishing House Pvt. Ltd., New Delhi.

Keeves, John.P,(1998). Educational Research Methodology and Measurement, An International Hand Book, Pergamon Press, Oxford.

Kerlinger, F.N. (1986).Foundations of Behavioural Research 3rd Edition, New York, Holt, Rinehart and Winston.

Kothari.C.R.(1998).Quantitative techniques. Vikas Publishing House, New Delhi.

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Siddhu, Kulbir Singh (2002). Methodology of Research in Education. Sterling Publications, New Delhi.

Unit - 1
Meaning, Characteristics and Nature of Research
Structure
1.1   Introduction
1.2   Learning Objectives
1.3   Meaning, Characteristics and Nature of Research
        Self-Check Exercise - 1
1.4   Summary
1.5   Glossary
1.6   Answer to Self-Check Exercise
1.7   References/Suggested Readings
1.8   Terminal Questions

1.1   Introduction
Dear learner, this unit deals with meaning, characteristics and nature of research.
1.2   Learning Objectives
After completing this unit, you will be able to;
  • describe the meaning and characteristics of research.
  • explain the nature of research.
1.3   Meaning and Characteristics of Research
The term "research" originates from the Latin word "to know," encapsulating a systematic approach to inquiry and knowledge acquisition. It poses unanswered questions, employs a structured procedure, and seeks empirical evidence rather than mere theoretical musings. Research aims to establish facts, attain objective truths, and address practical challenges.

In essence, research involves a systematic investigation of materials and sources to uncover new facts, address inquiries, and find solutions to problems. The term "research" is derived from the combination of "re" (meaning "again") and "search" (meaning "to find something new"). Therefore, research can be understood as a process of unraveling the underlying facts of a phenomenon.

Research endeavors to address unanswered questions and explore solutions to problems based on available data. It involves a well-planned method, adhering to the scientific method, ensuring the reliability of findings. Numerous social scientists have offered diverse definitions of research, as follows:

Research, defined in the Encyclopaedia of Social Sciences (1930) by D. Slesinger and M. Stephension, involves systematically manipulating objects, concepts, or symbols to extend, correct, or verify knowledge. Whether for theoretical construction or artistic practice, research serves this objective.

Mouly defines educational research as systematically applying scientific methods to solve educational problems.

Travers defines educational research as developing the science of behavior in educational settings. It enables educators to achieve their goals effectively.

Whitney defines educational research as the pursuit of solutions to educational problems using scientific philosophical methods.

Grinnell (1993: 4) defines research as a structured inquiry that utilizes acceptable scientific methodology to solve problems and create new knowledge that is generally applicable.

Burns (1997: 2) defines research as a systematic investigation to find answers to problems.

Kerlinger (1986: 10) defines scientific research as a systematic, controlled empirical, and critical investigation of propositions about the presumed relationships among various phenomena.

Bulmer (1977: 5) states that sociological research, as research, is primarily committed to establishing systematic, reliable, and valid knowledge about the social world.

John W. Best defines research as the more formal, systematic, and intensive process of carrying out scientific methods of analysis. It involves a more systematic structure of investigation, usually resulting in a formal record of procedures and a report of results or conclusions.

James Harvey Robinson defines research as diligent search that enjoys the high flavor of primitive hunting.

Redman and Mory (1923) defined research as a "systematized effort to gain new knowledge."

P.M. Cook has provided a comprehensive and functional definition of the term research: "Research is an honest, exhaustive, intelligent search for facts and their meanings or implications with reference to a given problem. The product or findings of a given piece of research should be an authentic, verifiable, and contribution to knowledge in the field studied." He has emphasized the following characteristics of research in his definition:

- It is an honest and exhaustive process.
- The facts are studied with understanding.
- The facts are discovered in the light of the problem. Research is problem-centered.
- The findings are valid and verifiable.
- Research work should contribute new knowledge in that field.

Therefore, research is a systematic process of examining phenomena from various perspectives. Research aims to establish relationships among different phenomena in the world. Research is based on the assumption that invariant relationships exist between certain antecedents and consequents, such that under specific conditions, certain consequents can be expected to follow the introduction

of a given antecedent. Thus, educational research aims to solve educational problems systematically and scientifically, to understand, explain, predict, and control human behavior.

Objectives of Research: Research aims to find answers to questions using scientific procedures to uncover unknown truths. While each research study has specific objectives, they can be broadly categorized as follows:

- To get a feel for new ideas about a topic (i.e., formative research studies);
- To accurately portray the characteristics of a specific individual, group, or situation (i.e., descriptive research studies).;
- To analyze the frequency with which something occurs (i.e., diagnostic research studies); and
- To examine the hypothesis of a causal relationship between two variables (i.e., hypothesis-testing research studies).

- Research aims to explore, describe, explain, predict, and influence. It's purposeful and follows the scientific method. It organizes data, analyzes it, and draws conclusions. Research addresses educational issues involving students, teachers, and institutions. It's precise, objective, and systematic. It discovers new facts, generates new knowledge, and leads to generalizations and conclusions. Research helps answer questions and is organized, planned, and patient. It has logical roots and is based on direct experience or observation. Research uses proven analytical procedures to gather data, whether historical, descriptive, experimental, or case study. Research is empirical, systematic, valid, reliable, and can take various forms. It's testable and objective.

Self-Check Exercise – 1

Q. Who said, "Educational Research is the systematic application of scientific method for solving for solving educational problem." ?

1.4   Summary

Dear learner in this unit we have discussed the meaning, characteristics, nature of research in detail.

1.5   Glossary

Abstract: A quick rundown of a research project and its findings. A summary of a study that highlights its key points, including major results and conclusions.

Accessible population: The group of people the researcher can reasonably choose from for a sample, and to whom the researcher can make generalizations based on the findings.

Acculturation: The process of adapting to another culture, especially when it involves blending in with the majority population [e.g., an immigrant adopting American customs].

Achievement test: A tool used to measure how well individuals know or can perform in specific areas of knowledge or skill.

Action plan: A plan to put changes into action after an action research study.

Action research: A type of research that focuses on a specific local issue and leads to an action plan to address the problem.

1.6   Answer to Self-Check Exercise

Self-Check Exercise – 1

Answer: Mouly

1.7   References/Suggested Readings

Agrawal, J. C. (1968). Educational Research. New Delhi :Arya Book Depot.

Best, J. W. (1982).Research in Education. New Delhi : Prentice Hall of India Pvt. Ltd.

Campbell, W.G. et. al (1968). Form & Style in Thesis. Boston : Writing HoushtonMifin Co.

Coery, (1953). Action Research to Improve School Practices. New York : Teachers College, Columbia University.

Garrertt, H. E., (1981). Statistics in Psychology & Education.VakitsFeffer & Simons Ltd.

Good & Scates.Methods of Research. Fox, D. J., The Research Process in Education. (Holt).

Guilford, J. P., (1950). Fundamental Statistics in Psychology & Education. McGraw Hill Book Com.

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Panneerselvam, R., Research Methodology, Prentice Hall of India, New Delhi, 2004.

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Tuckman, Bruce W., (1978). Conducting Educational Research. New York: Harcourt Barce JavanovichIng.

Zuber-Skerritt, O. (1996b) Emancipatory action research for organisational change and management Victoria, Australia: Deakin University Press.

1.8 Terminal Questions

1. Describe the meaning and characteristics of research.
2. Explain the nature of research

Unit – 2
Nature and Significance of Educational Research
Structure

2.1   Introduction
Dear learner, this unit deals with nature and Significance of educational research.

2.2   Learning Objectives
At the end of this unit, students will be able to;
- describe the nature and significance of educational research.

2.3   Nature and Significance of Educational Research
Nature of Educational Research

Educational research is like any other research. It's systematic, reliable, and valid to find the truth, investigate knowledge, and solve problems. (William Wiersma, 1991)

The educational research process involves collecting information to investigate problems and knowledge. But it's more complex because it can use different approaches and strategies to solve problems in an educational setting. It can also involve many disciplines like educational psychology, anthropology, sociology, and history.

Educational research is important because it contributes to knowledge development, practical improvements, and policy information. (John W.Creswell, 2005)

So, educators can use those research findings to improve their skills and teaching and learning process.

The characteristics of educational research are part of its nature. According to Gary Anderson (1998), there are ten characteristics of educational research. These are as follows:

- Educational research tries to solve a problem.
- Educational research collects new data from primary or first-hand sources or uses existing data for a new purpose.
- Educational research is based on observable experience or empirical evidence.
- Educational research demands accurate observation and description.
- Educational research usually uses carefully designed procedures and rigorous analysis.
- Educational research emphasizes the development of generalizations, principles, or theories that will help in understanding, predicting, and/or controlling.
- Educational research requires expertise-familiarity with the field; competence in methodology; technical skill in collecting and analyzing the data.
- Educational research is like a detective mission, trying to find a fair and accurate solution to the problem. They make sure everything they do is legit and backed up by evidence.
- Educational research is a slow and steady process, but it's always moving forward. They might start with a big question, but as they dig deeper, they might find new questions or ways to look at the problem.
- Educational research is like a treasure hunt, and they keep a detailed record of everything they find. They share their findings with others who are interested in the problem, so everyone can learn from it.

Research in Education: Unlocking Progress

Hudson Maxim once said, "All progress comes from inquiry. Doubt is better than overconfidence because it leads to inquiry, and inquiry leads to invention." This quote highlights the importance of research in education. More research means more progress. It encourages scientific and inductive thinking, helps develop logical thinking habits, and promotes organization.

Research is becoming increasingly important in social sciences. The complexity of human behavior, government, and business has made research crucial for solving problems.

Research plays a key role in creating new policies. It helps create alternative policies and examines their effects. This helps policy-makers make informed decisions. Research also helps allocate resources effectively.

Research is essential for gathering information about an economy's social and economic structure to understand changes happening in the country. Collecting statistical data, though not a routine task, involves various research problems.

Research involves three main stages:

1. Investigating the economic structure by continuously collecting facts.
2. Diagnosing events and analyzing the forces behind them.
3. Predicting future developments.

Research is crucial for solving business and industry problems. Operations research, market research, and motivational research provide valuable insights that help make informed decisions. Motivational research helps understand why people behave based on market characteristics.

Research is super important for social scientists. It helps them understand social relationships and figure out why things happen the way they do. It's also really satisfying to learn just for the sake of learning. And guess what? Research can also help social scientists solve real-world problems. They can use their knowledge to make things better or work more efficiently. Social science research is all about both learning for the sake of learning and learning to solve practical problems.

Research in education is super important for several reasons:

1. Better Teaching Methods: Research helps teachers find the best ways to teach, so students learn more effectively. It tells them what works best in different situations and for different students.
2. Improved Curricula: Educational research helps create and improve curricula that meet the needs of students and align with educational goals. It makes sure the curriculum is relevant, up-to-date, and engaging.
3. New Ideas in Education: Research pushes the boundaries of education by exploring new technologies, teaching methods, and learning environments. It helps teachers adapt to changing times and prepare students for the future.
4. Making Informed Decisions: Research gives teachers evidence to support or challenge existing teaching methods. It helps them make decisions based on facts rather than just their feelings or traditions, leading to better teaching and learning.
5. Better Policies: Educational research helps make decisions about education at different levels, from local schools to national governments. It gives policymakers evidence to base their decisions on, like funding, standards, and reforms.
6. Closing Educational Gaps: Research helps find and fix problems in education, like unequal access to education and opportunities. It helps understand what's causing these gaps and works to make education more fair and inclusive.
7. Better Teachers: Research helps teachers learn new things and improve their teaching skills. It gives them insights into effective teaching methods and ways to support different students.
8. Student Achievement: The main goal of educational research is to help students succeed. By improving teaching, the curriculum, and policies, research makes learning better for all students.

In summary, research in education is super important for learning more, improving things, making sure everyone has a fair chance, and making sure students get a great education.

Self-Check Exercise - 1

Q. What is the nature of research?

2.4   Summary

Dear learner in this unit we have discussed the nature of educational research and significance of research in education in detail.

2.5   Glossary

Bibliography: A list of books you've used in your research project. It usually comes at the end or as a separate section called an appendix.

Case Study: A detailed look at a specific person or small group. You often get data from them themselves.

Causal Analysis: Figuring out how one thing causes another.

Causal-Comparative Research: Research to figure out why or how things are different between groups of people. Also called ex post facto research.

Census: Trying to get data from every single person in a population.

2.6 Answer to Self-Check Exercise

Self-Check Exercise – 1

Answer: The nature of research is:

- - Educational research solves problems.
- - It gathers new data from primary or first-hand sources or uses existing data for a new purpose.
- - It's based on observable experience or empirical evidence.
- - It requires accurate observation and description.
- - It usually employs carefully designed procedures and rigorous analysis.

2.7 References/Suggested Readings

Agrawal, J. C. (1968). Educational Research. New Delhi :Arya Book Depot.

Best, J. W. (1982).Research in Education. New Delhi : Prentice Hall of India Pvt. Ltd.

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2.8   Terminal Questions
  1. Describe the nature of educational research.
  2. Explain the significance of research in education

Unit – 3
Types of Educational Research (Fundamental, Applied and Action Research)

Structure
3.1   Introduction
3.2   Learning Objectives
3.3   Types of Educational Research (Fundamental, Applied and Action Research)
        Self-Check Exercise - 1
3.4   Summary
3.5   Glossary
3.6   Answer to Self-Check Exercise
3.7   References/Suggested Readings
3.8   Terminal Questions

3.1   Introduction
Dear learner, this unit deals with types of educational research (fundamental, applied and action research).

3.2   Learning Objectives
After completing this unit, you will be able to;
  • discuss various types of educational research (fundamental, applied and action research).

3.3   Types of Educational Research (Fundamental, Applied and Action Research)
Mainly educational research can be classified into following two broad categories:

1. From the point of view of contribution
(i)   Fundamental research
    a) Experimental research
    b)   Historical   research

    c) Philosophical research
(ii)   Action   research

(iii)   Applied   research

2.   From   the   point   of   view   of   research

(i)   Longitudinal   approach

(ii)   Cross-section approach

Hey there, learner! In this unit, we'll be diving into the world of fundamental, applied, and action research.

Fundamental Research: This is the kind of research that builds on what we already know and adds to the big picture of science. It's not always about finding practical solutions right away, but it's all about figuring out the theory and understanding the world better. Think of it as the foundation of knowledge.

Applied Research: This is the research that takes the findings from fundamental research and applies them to real-world problems. It's like using the tools we've built to solve practical issues.

Action Research: This is the research that combines the best of both worlds - fundamental and applied research. It's about using the knowledge we've gained to make a difference in the world. It's like being a scientist detective, solving problems and making a positive impact.

Fundamental research, also known as basic research or pure research, is a type of scientific inquiry that aims to expand our knowledge and understanding of the fundamental principles, theories, and laws of nature or a specific discipline. It's driven by curiosity and the desire to explore the underlying mechanisms of phenomena without necessarily having immediate practical applications in mind. Here are some key characteristics and aspects of fundamental research:

1. Exploring Basic Concepts: Fundamental research focuses on exploring fundamental concepts, principles, and theories within a particular field of study. It seeks to answer fundamental questions and understand the foundational aspects of phenomena.
2. Pure Knowledge Pursuit: The primary goal of fundamental research is to generate new knowledge and advance understanding rather than solve specific practical problems or develop new technologies directly.
3. Theory Development and Testing: Researchers engaged in fundamental research often develop or refine theories to explain observed phenomena. These theories are tested through rigorous experimentation, observation, or theoretical analysis.
4. Long-Term Impact: While fundamental research may not have immediate practical applications, its findings often serve as the basis for applied research and technological innovations in the future. Many ground-breaking discoveries and inventions have roots in fundamental research.
5. High Degree of Uncertainty: Fundamental research often involves exploring unknown territory, which can be characterized by uncertainty and unpredictability. Researchers may encounter unexpected results that lead to new avenues of exploration.
6. Cross-Disciplinary Connections: Fundamental research can bridge multiple disciplines by uncovering fundamental principles that apply across different fields. This interdisciplinary approach fosters collaboration and a broader understanding of complex phenomena.
7. Academic and Intellectual Contribution: Fundamental research contributes to the academic and intellectual growth of a discipline by challenging existing theories, stimulating debate, and inspiring new lines of inquiry.

Fundamental research is like the super-intelligent detective work that helps us understand the world. It looks at the tiniest things like atoms and the biggest things like how our brains work. While

applied research is like solving specific puzzles, fundamental research is like building a giant puzzle that helps us see the bigger picture.

Applied research is all about solving real-world problems. It's not just about adding to scientific knowledge; it's about finding practical solutions that make a difference. According to Travers, applied research is all about solving pressing problems and finding practical solutions. Basic research, on the other hand, is more about finding information that can be used in a wide range of ways and adds to the existing body of scientific knowledge. Lisa (2008) says that applied qualitative research is all about making sure that knowledge is useful and can be applied to real-world problems. It's about creating knowledge that can be used to solve problems and make a difference in people's lives. Applied research can be used in many different areas, including human services, public policy, and education. It can help to address social problems and improve the lives of people around the world. Community-based researchers, like community psychologists, use applied research to analyze and develop communities, evaluate programs, and prevent issues like substance abuse and violence. They also empower vulnerable populations. Applied research's flexibility and usefulness allow it to be done in various settings, like social services, schools, government agencies, businesses, and communities. Other common forms include demography and survey research, often used by marketing firms, opinion organizations, and government agencies. In 1962, RusselAckoff outlined the steps for optimizing applied research. He divided it into six phases:

- 1. Formulate the problem
- 2. Construct the model
- 3. Test the model
- 4. Derive a solution from the model
- 5. Test and control the solution
- 6. Implement the solution
-

Max Elden and Rupert Chisholm suggested three stages:

- 1. Diagnose the problem
- 2. Plan action
- 3. Implement and evaluate

In applied research, the first and last phases are the most unique and important. Applied research is all about making knowledge useful and practical, so the problem-solving process is super important. It should involve community members, decision makers, stakeholders, and experts in the field. Ackoff said that applied research answers a specific question, and the researcher's job is to turn a decision maker's problem into a research question. He suggested that this involves four main parts: who the decision maker is, what they want, what they can do, and what's outside their control.

Applied research is like scientific detective work that solves real-world problems. It's different from fundamental research, which tries to understand the basics. Applied research focuses on using existing knowledge to make things better. Here are some key things about applied research:

1. Problem-Solving: Applied research is all about solving specific problems that people face in real life. It's about finding solutions that can be used right away to make things better.
2. Immediate Use: The main goal of applied research is to create practical solutions, products, or processes that can be used right away to improve things.
3. Translational Approach: Applied research is like translating knowledge and theories from the lab into real-world solutions. It's like bridging the gap between theory and practice.
4. Goal-Oriented and Results-Driven: Researchers conducting applied research are like mission-driven detectives. They set clear goals and objectives to solve specific problems or achieve defined outcomes within a specific timeframe.
5. Collaboration with Stakeholders: Applied research is like a team effort. Researchers often work with industry partners, policymakers, and end-users who can provide valuable insights, resources, or practical guidance throughout the research process.
6. Iterative Process: Applied research is like a never-ending game of trial and error. Researchers may go through multiple cycles of testing, refinement, and validation to ensure that the solutions or innovations developed are effective, reliable, and meet the intended objectives.
7. Direct Impact on Society and Economy: Applied research is like a superhero that saves the day! It contributes to societal progress and economic development by addressing pressing issues, improving processes, enhancing products, or developing new technologies that benefit individuals, organizations, and communities.

Applied research is like science meets practicality. It's all about finding solutions to real-world problems. Think about medical treatments, new materials, better farming methods, and efficient transportation. Applied research helps us turn scientific discoveries into useful stuff that makes our lives better.

Action research is a specialized form of applied research that involves individuals, such as educators or researchers, in addressing their own challenges using scientific methodologies. This process entails thorough examination of their issues, implementation of necessary changes, and subsequent evaluation of their effectiveness. By engaging in this iterative process, they can enhance their practices and contribute positively to their communities.

Kemmis and McTaggart (1992:16) define action research as a multifaceted approach that simultaneously addresses the transformation of individuals and the cultural context within which they exist. The cultural makeup of a group encompasses its characteristic language, discourses, activities, practices, social relationships, and organizational structures that shape interactions within the group.

Furthermore, Kemmis emphasizes that action research is a collaborative form of self-reflective inquiry undertaken by participants in social situations. Its primary objective is to enhance the rationality and justice of social or educational practices, as well as the participants' comprehension of these practices and the contexts in which they are implemented. While action research inherently involves collaboration, it is crucial to recognize that the collective progress achieved through group action is ultimately the result of critically examined actions undertaken by individual group members.

Sara Blackwell defines action research as "research concerned with school problems carried on by school personnel to improve school practices."

Mc. Threte defines action research as "organized, investigative activity aimed at studying and constructive change of given endeavors by individuals or groups concerned with change and improvement." Action research holds significant importance for several reasons:

1. Improving Practice: Action research enables practitioners (educators, managers, healthcare professionals, etc.) to systematically investigate and reflect on their own practices. This process often leads to improvements in teaching methods, organizational processes, patient care strategies, and more.
2. Empowering Practitioners: By engaging in action research, practitioners become active agents in the research process. They gain a deeper understanding of the challenges they face and are empowered to develop and implement solutions that are contextually relevant and effective.
3. Addressing Specific Contexts: Action research is particularly valuable in addressing issues that are specific to particular contexts or settings. It allows researchers to tailor interventions and strategies to fit the unique needs and circumstances of the individuals or organizations involved.
4. Promoting Collaboration: Action research often involves collaboration between researchers and practitioners, as well as among stakeholders within a community or organization. This collaborative approach fosters shared learning, builds relationships, and promotes collective problem-solving.
5. Generating Practical Knowledge: Action research generates knowledge that is immediately applicable and useful in real-world settings. It produces insights and findings that can directly inform decision-making, policy development, and professional practice.
6. **6. Continuous Improvement:** Action research is underpinned by the iterative cycle of planning, action, observation, and reflection. This process facilitates continuous improvement by enabling practitioners to refine their approaches through ongoing feedback and evaluation.
7. **7. Enhancing Innovation:** Action research promotes innovation by encouraging practitioners to experiment with novel ideas, methods, and approaches. It provides a structured framework for testing innovations in controlled environments and assessing their impact.
8. **8. Building Capacity:** Engaging in action research enhances the capacity of individuals and organizations to conduct research, analyze data, and make informed decisions based on evidence. It fosters a culture of learning and evidence-based practice.
9. **9. Advancing Knowledge:** While action research primarily focuses on practical outcomes, it also contributes to the broader body of knowledge in various fields, including education, healthcare, social work, and management. Findings from action research can inform and inspire further research and scholarly inquiry.

In essence, action research serves as a pivotal tool, empowering practitioners, enhancing practice, addressing specific contextual challenges, promoting collaboration, generating practical knowledge, supporting continuous improvement, fostering innovation, building capacity, and contributing to the advancement of knowledge across diverse domains. It is a robust approach that seamlessly integrates research and practice, enabling the creation of meaningful transformations and enhancing outcomes in various settings.

Characteristics of Action Research

Action research, as proposed by Hult and Lennung (1980:241-50) and McKernan (1991:32-3), is characterized by the following:

- 1. **Practical Problem-Solving and Scientific Knowledge Expansion:** Action research facilitates practical problem-solving and contributes to the expansion of scientific knowledge.

- 2. **Enhanced Participant Competencies:** It fosters the development and enhancement of participant competencies.
- 3. **Collaborative Nature:** Action research emphasizes collaboration among participants.
- 4. **Direct Implementation in Real-World Situations:** It is conducted directly in the context of the problem at hand.
- 5. **Cyclical Feedback Process:** Action research utilizes feedback from data in an ongoing, cyclical process.
- 6. **Understanding Complex Social Situations:** It aims to comprehend intricate social situations.
- 7. **Understanding Social System Change Processes:** It seeks to elucidate the processes of change within social systems.
- 8. **Ethical Framework Adherence:** Action research is conducted within an established ethical framework.
- 9. **Improving Human Action Quality:** It strives to enhance the quality of human actions.
- 10. **Addressing Immediate Practical Concerns:** Action research focuses on problems of immediate relevance to practitioners.
- 11. **Participatory Nature:** It promotes participation from all relevant stakeholders.
- 12. **Case Study Frequency:** Action research often employs case studies as a research tool.
- 13. **Variable Isolation and Control Avoidance:** It tends to avoid the paradigm of research that isolates and controls variables.
- 14. **Formative Nature:** Action research is formative, allowing for alterations in the problem definition, aims, and methodology during the process.
- 15. **Evaluation and Reflection:** It incorporates evaluation and reflection processes.
- 16. **Methodological Eclecticism:** Action research embraces a diverse range of methodologies.
- 17. **Contributions to Education Science:** It contributes to the development of a science of education.
- 18. **Usability and Shareability:** Action research aims to render its findings usable and shareable by participants.
- 19. **Dialogical Approach and Discourse Celebration:** It fosters a dialogical approach and celebrates discourse.
- 20. **Critical Purpose (in Certain Forms):** Action research may possess a critical purpose in specific contexts.
- 21. **Emancipatory Intentions:** It strives to promote emancipatory outcomes.
- Additionally, Zuber-Skerritt (1996b:85) defines action research as critical (and self-critical) collaborative inquiry undertaken by reflective practitioners who are accountable and transparent about their findings.
- Kemmis and McTaggart (1992) distinguish action research from the everyday actions of teachers, noting that action research is more systematic and collaborative in its approach to collecting evidence for rigorous group reflection.

- **Action Research:**
- Action research is *not* merely problem-solving; it involves problem-posing as well. It does not commence from a perspective of 'problems' as pathologies. Instead, it is driven by a quest to enhance and comprehend the world through transformation and the acquisition of knowledge on how to improve it from the consequences of the changes implemented.
- **Characteristics of Action Research:**
- Action research is research conducted by individuals on their own work, aimed at enhancing their performance, including their interactions and collaborations with others.

Distinction from Traditional Research:

- Action research is distinct from research conducted on others. It is *not merely an application of* 'the scientific method' to teaching. There are various interpretations and perspectives of 'the scientific method.'

Here are the six steps of research:

1. **Define the Problem:** First, we pick a problem and figure out what it means. This step is important because it helps us know what we're looking for and what we can't look for.

2. **Come Up with Ideas:** Next, we brainstorm some possible solutions to the problem. These ideas are called hypotheses, and they're based on our assumptions.

3. **Test the Hypotheses:** Now, we test the hypotheses to see if they're true or not. We design a research plan to collect data or evidence that we can use to test the hypotheses. This plan includes the method we'll use, the sample we'll use, and the techniques we'll use.

4. **Collect Data:** We collect data or evidence by observing the subjects and asking them questions. We score their responses and organize the data in a table.

5. **Analyze the Data:** We use statistical techniques to analyze the data and see if the hypotheses are true or not. We look at the data and make decisions based on what we find.

6. **Share the Results:** We share the results of our research with others and make conclusions based on what we've found. We use the results to solve practical problems and come up with new ideas.

A Paradigm of Action Research Projects

The proposed steps and sub-steps for conducting action research projects are outlined by the National Council of Educational Research and Training (NCERT):
1. Project topic
2. Project objective
3. Project work system
4. Project evaluation

5. Project expenditure estimation

6. Institution name, student enrollment, and section breakdown

7. Teacher count per subject

8. Available school facilities for project work

- **Background for the project work:**
- - Project significance to the school
- - Problem identification
- - Problem definition and delimitation
- - Action hypothesis formulation
- - Action hypothesis testing
- - Project conclusions
- - Investigator's remarks

On these lines the teacher plans an experimental project, after conducting the experiment he writes a report of his project work.

Self-Check Exercise - 1

Q. What is fundamental research?

3.4   Summary

Dear learner in this unit we have discussed the types of educational research (fundamental, applied and action research) in detail.

3.5   Glossary

Content Analysis: This is like a systematic look at all the records, documents, and notes you have.

Content Validity: This is similar to face validity, but the researcher specifically asks experts in the field to give their opinions on how well the measure works.

Content Validity: This is how well a test or assessment matches the real-world requirements of the situation.

Control Group: In an experiment, this is the group that gets either no treatment or a different treatment than the experimental group. This group can be compared to the experimental group to see if the treatment made a difference.

Error of Measurement: This happens when individual scores on the same test don't match up.

Estimate: This is like guessing the cost, size, or value of something.

Estimation: This is the process of using sample data to guess the value of an unknown quantity in a larger population.

3.6   Answer to Self-Check Exercise

Self-Check Exercise - 1

Answer: Fundamental or basic research is designed to add to an organized body of scientific knowledge and does not necessarily produce results of immediate practical value. Basic research is primarily concerned with the formulation of the theory or a contribution to the existing body of knowledge. Its major aim is to obtain and use the empirical data to formulate, expand or evaluate theory. This type of research draws its pattern and spirit from the physical sciences. It represents a rigorous and structured type of analysis. It employs careful sampling procedures in order to extend the findings beyond the group or situations and thus develops theories by discovering proved generalizations or principles. The main aim of basic research is the discovery of knowledge solely for the sake of knowledge. For example, advances in the practice of medicine are dependent upon basic research in biochemistry and microbiology. Likewise, progress in educational practices has been related to progress in the discovery of general laws through psychological, educational, sociological research.

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3.8 Terminal Questions

1. Discuss the types of educational research

Unit-4
Problems relating to Different Stages of Education
Structure
4.1   Introduction
4.2   Learning Objectives
4.3   Problems relating to Different Stages of Education
        Self-Check Exercise - 1
4.4   Summary
4.5   Glossary
4.6   Answer to Self-Check Exercise
4.7   References/Suggested Readings
4.8   Terminal Questions

4.1   Introduction
Dear learner, this unit deals with problems relating to different stages of education.

4.2   Learning Objectives
After completing this unit, you will be able to;
 • discuss various problems relating to different stages of education.
4.3   Problems relating to Different Stages of Education

Educational challenges vary significantly across different stages, from early childhood education to higher education. Here are some common challenges faced at each stage:
Early Childhood Education (Preschool and Kindergarten):
   1. 1. **Access and Affordability:** Many families face difficulties in accessing affordable early childhood education programs, which can hinder a child's readiness for formal schooling.
   2. 2. **Program Quality:** Disparities in the quality of early childhood education programs exist, affecting outcomes for children from diverse socioeconomic backgrounds.
   3. 3. **Teacher Training and Qualifications:** Ensuring that early childhood educators possess adequate training and qualifications to support children's development can be a challenge.
   4. 4. **Equity and Inclusion:** Ensuring that early childhood education is inclusive and accommodates the needs of all children, including those with disabilities or from marginalized communities, remains a concern.
   5. 5. **Parental Involvement:** Encouraging meaningful parental involvement in early childhood education and fostering positive home-school partnerships can be challenging.
Primary Education (Elementary and Middle School):

   1. 1. **Teaching Quality:** Variations in teaching quality and teacher shortages impact the educational experience and outcomes of students.
   2. 2. **Curriculum Relevance:** Ensuring that the curriculum is relevant, engaging, and aligned with educational standards while accommodating diverse learner needs remains a persistent challenge.

3. 3. **Equity in Access:** Disparities in access to quality primary education persist based on socioeconomic status, geographic location, and cultural factors.
4. 4. **Student Engagement:** Maintaining student engagement and motivation, particularly during grade level transitions, can be challenging.
5. 5. **Assessment and Accountability:** Striking a balance between rigorous assessment and the need to support holistic student development and well-being remains a challenge.

Secondary Education (High School):

1. **Dropout Rates:** High dropout rates, particularly among disadvantaged and at-risk populations, pose a significant challenge.

2. **Preparation for Higher Education and Careers:** Ensuring that students are adequately prepared for post-secondary education or the workforce, including acquiring relevant skills and knowledge, remains a persistent issue.

3. **Equity and Inclusion:** Addressing disparities in access to advanced coursework, extracurricular activities, and supportive services for all students is paramount.

4. **Technology Integration:** Effectively integrating technology into teaching and learning is an ongoing challenge, while simultaneously addressing digital divides among students is essential.

5. **Support for Diverse Learners:** Meeting the diverse needs of learners, including those with learning disabilities, English language learners, and gifted students, necessitates specialized support and resources.

Higher Education (College and University):

1. **Cost and Accessibility:**
2. - Rising tuition costs and student debt burdens, coupled with challenges in accessing financial aid, significantly impact access to higher education.

3. **Quality of Education:**
4. - Ensuring high-quality education and rigorous academic standards remains a challenge, particularly in the face of budget constraints and faculty shortages.

5. **Employability:**
6. - Aligning educational programs with workforce needs and ensuring graduates are prepared for meaningful employment in a rapidly evolving economy is paramount.

7. **Diversity and Inclusion:**
8. - Promoting diversity, equity, and inclusion on campus and addressing issues related to campus climate, discrimination, and harassment are ongoing challenges.

9. **Technology and Innovation:**

10. - Embracing technological advancements and fostering innovation in teaching and research while ensuring equitable access and addressing digital literacy gaps among students and faculty are essential priorities.

Each stage of education presents distinct challenges that necessitate thoughtful policies, substantial investments in resources, professional development for educators, and collaborative efforts among stakeholders to address effectively.

Enclosed is a comprehensive list of broad research topics and pertinent problems related to education. These subjects impact various parties within a school, college, and university setting.

- * **Learning New Research Tools and Methods:** It would be beneficial to research the diverse potential solutions, including filtering, online search, restricted access, blocking software for students during class or at the media center, training, and parental permission procedures. This research would elucidate the strategies teachers can employ to enhance research skills for students and staff.

- * **Improved Integration of Technology into Lesson Plans:** It would be advantageous to explore innovative methods for integrating technology into all school subject areas and grade levels.

- * **School Crime Prevention:** Researching the causes, effects, and outcomes of school crime, including theft, vandalism, assault, verbal harassment, physical harassment, abuse, fighting, and other disruptive behaviors, would be a valuable endeavor. The goal would be to identify effective strategies to reduce crime within the school environment.

- * **School Safety Improvements:** Evaluating existing safety measures and identifying potential improvements to enhance the protection of students and faculty is essential. This could involve reviewing practices such as hallway running and student dismissal procedures to find innovative ways to enhance safety.

- * **Class Tardiness Management:** Investigating the reasons behind student tardiness, its impact on teachers and learning, and potential strategies for reducing tardiness would be beneficial. This research would also provide insights into effective approaches for addressing tardiness within the school staff. Developing a comprehensive "unified tardy policy" for the school would be a significant undertaking.

- **1. Truancy (Overboard Absences):**
- Teachers often have varying policies, punishments, and perspectives when dealing with students who are excessively absent from class and/or school. What are the underlying causes of this issue? How can we collectively work towards improving student attendance?

- **2. Enhancing Methods to Address the Needs of Diverse Learners:**
- School campuses often have diverse populations, including gifted and non-English-speaking students. What methods, policies, and strategies are currently in place to support these diverse learners? Could these methods be improved or created to enhance their learning? How can technology be utilized to bridge this gap and improve learning outcomes?

- **3. Incorporating More School Community Service Programs and Promoting Parent Volunteering:**
- What can your school do to enhance community service programs? How can you attract more parental volunteer involvement? What initiatives have you implemented or could you implement to demonstrate the value and necessity of community service activities for students?
- **4. Improved Integration of Web 2.0 Technologies into the Curriculum:**
- How can your staff utilize more programs, such as implementing Web 2.0 tools within the curriculum, to enhance learning? Is your school adequately engaging learners by employing a diverse range of teaching methods?

The Indian education system faces a variety of challenges and opportunities. These issues are influenced by factors like socioeconomic disparities, cultural diversity, governance problems, infrastructure limitations, and the needs of a growing population. Here are some key research problems in the Indian education system:

1. Quality of Education:
    - What factors affect the quality of education in different states, regions, and schools (e.g., government schools, private schools)?
    - How can teaching methods be improved to improve learning outcomes in subjects like math, science, and languages?
    - What role does teacher training, qualifications, and professional development play in improving educational quality?

1. Access and Equity:
    - What are the barriers to equal education opportunities for marginalized groups, including girls, children from poor families, and those with disabilities?
    - How effective are government policies and interventions in promoting inclusive education and reducing disparities in access to quality education?
    - How do socioeconomic factors, caste-based discrimination, and cultural norms affect educational opportunities and outcomes?

1. Educational Infrastructure and Resources:
    - What are the challenges related to inadequate infrastructure, such as lack of classrooms, libraries, laboratories, and basic amenities in schools, especially in rural and remote areas?
    - How can technology be used to improve educational infrastructure and access to digital resources across urban and rural schools?
    - What are the best practices for using existing resources to ensure equal access to quality educational facilities?

1. 4. Curriculum Design and Adaptation:
2. What factors affect the quality of education in different states, regions, and schools (e.g., government schools, private schools)?
3. How can teaching methods be improved to improve learning outcomes in subjects like math, science, and languages?

4. What role does teacher training, qualifications, and professional development play in improving educational quality?

o   How can we make the school curriculum more relevant to the diverse needs of our students and in line with global educational standards?

o   What are the challenges and opportunities in integrating vocational education and skills training into mainstream education to make our students more employable?

o   How can we incorporate indigenous knowledge systems and cultural heritage into the curriculum to foster cultural understanding and pride?

5. Teacher Recruitment, Training, and Retention:
    o   What are the factors that affect teacher recruitment, deployment, and retention, especially in remote and rural areas?
    o   How effective are our current teacher training programs in equipping educators with the skills and teaching methods to meet the diverse learning needs of our students?
    o   What strategies can we use to boost teacher motivation, job satisfaction, and professional development opportunities?

6. Assessment and Examination Systems:
    o   How do our current assessment practices, including standardized testing and board examinations, affect student learning, stress levels, and overall educational outcomes?
    o   What are the alternatives to high-stakes examinations that can accurately assess student progress and learning outcomes?
    o   How can assessment practices be aligned with our educational goals to promote holistic development and critical thinking skills?

7. Education Policy and Governance:
    o   What are the implications of national and state-level education policies, such as the Right to Education Act, on educational access, equity, and quality?
    o   How can governance and administrative reforms improve the efficiency and effectiveness of education delivery systems at various levels?
    o   What are the challenges in implementing and monitoring policy initiatives aimed at improving educational outcomes, and how can these challenges be addressed?

8. Impact of Digital Learning and Technological Integration:

o   How has the rise of digital learning tools (like online platforms and e-learning resources) changed how we teach and how students learn?

o   How do students and teachers have different access to technology and digital skills? What can we do to make sure everyone has a fair chance?

o   What are the ethical issues and challenges we need to consider?

To tackle these research challenges, we need to conduct empirical studies, analyze policies, and come up with innovative solutions. This will help us make evidence-based reforms and improve the Indian education system. It's important to work together as researchers, policymakers, educators, and community members to create sustainable solutions that make sure everyone has access to quality education.

Self-Check Exercise - 1
Q. What is grounded theory?

4.4   Summary

Dear learner in this unit we have discussed the problems relating to different stages of education in detail.

4.5   Glossary

External Criticism: In historical research, this is when you evaluate the accuracy and reliability of a document.

Exploratory Study: When there aren't many studies or theories to guide you, you conduct an exploratory study to explore a research problem or question.

Confounding Variable: This is a variable that's not relevant to the study but can distort the results if you don't account for it.

Control Variable: This is a variable that's not important to the study but can affect the statistical analysis. In statistical analyses, you keep control variables constant or remove their influence to better understand how the outcome variable relates to other variables.

4.6   Answer to Self-Check Exercise

Self-Check Exercise - 1

Answer: Grounded theory research is an inductive approach in which a theory is developed based on data. This is the opposite of the traditional hypothesis-deductive research approaches where hypotheses are formulated and are then tried to be proved or disproved.

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4.8   Terminal Questions

1. Discuss the problems relating to different stages of education.

Unit – 5
Priority Areas in Educational Research
Structure
5.1   Introduction
5.2   Learning Objectives
5.3   Priority Areas in Educational Research
        Self-Check Exercise - 1

5.1   Introduction

Dear learner, this unit deals with priority areas in educational research.

5.2   Learning Objectives

After completing this unit, you will be able to;

- discuss the priority areas in educational research.

5.3   Priority Areas in Educational Research

In India, educational research is all about tackling challenges and making education better for everyone, from kids to grown-ups. They're working hard for quality improvement and accessibility of education, no matter where you are or what you study.

1. Quality of Education:
   - We're all about improving the quality of teaching and learning. We're looking into how to make sure everyone gets a good education, especially in math, science, and languages.
   - We're also exploring effective teaching methods and strategies to make learning more engaging.

2. Equity and Inclusion:
   - We're committed to making sure everyone has equal access to education, regardless of their background. We're researching inclusive education practices and policies to ensure that everyone has a fair chance to succeed.

3. Teacher Education and Professional Development:
   - We're studying how to recruit, train, and support teachers, especially in remote and rural areas. We're also evaluating the impact of teacher professional development programs on teaching quality and student achievement.

4. Educational Technology and Innovation:
   - We're on a mission to revolutionize teaching and learning by leveraging digital learning technologies and online platforms. We are also evaluating the effectiveness of educational apps, digital resources, and blended learning models in enhancing educational outcomes.

5. Skills Development and Vocational Education:
   - We're investigating how to make sure that educational programs meet the needs of the workforce and promote vocational education and skill development. We're also researching the impact of vocational training on employment outcomes and economic development.

6. Higher Education and Research:

- We're studying issues related to access, quality, and governance in higher education institutions. `We're also researching` innovations in higher education curriculum, research methodologies, and interdisciplinary studies.

7. Policy Analysis and Education Governance:
   - We're evaluating the implementation and impact of national and state-level educational policies, such as the Right to Education Act. We're also researching governance reforms and administrative practices to improve educational delivery and accountability.

8. Assessment and Evaluation:
   - We'll explore different ways to assess students, like holistic development and critical thinking skills.
   - We'll also look at how standardized testing and exams really measure what students learn and how well they do in school.

9. Early Childhood Education:
   - We'll research how early childhood education programs affect kids' brains, social skills, and physical development.
   - We'll also study how to teach early reading and math skills so kids are ready for school and can succeed in the long run.

10. Environmental and Sustainable Education:
   - We'll figure out how to teach kids about the environment and how to live sustainably.
   - We'll also come up with ways to get kids to care about the environment, save energy, and live in a way that's good for the planet.

In India, educational research is focusing on some key areas to tackle tough problems, make informed policy choices, and come up with new ideas that can make education better for everyone.

It's important to work together with researchers, policymakers, educators, and community members to make real and lasting improvements in the Indian education system.

- Here are some areas of research I'm interested in:
-
- - Classroom research, especially in upper secondary education.
- - Universalization and free and compulsory education.
- - Educational leadership and school governance.
- - Dropout rates and equal opportunities.
- - Vocationalization and population education.
- - Education for handicapped and talented individuals.
- - Education for economic growth.
- - Coordinating educational agencies in education.

- - Organizing school meals.
- - Follow-up studies of old students.
- - Homework and study habits.
- - Student welfare schemes.
- - International comparative educational research.
- - Professional portfolio; career entry phase, including induction and probation.
- - Continuing professional development, including current needs (individual, school, system), current provision, etc.
- - Developing professional learning communities; standards of teaching, knowledge, skill, and competence across the continuum.
- - Perceptions of the Teaching Council; effective strategies for partnership between the Council and its stakeholders.
- - Perceptions of teacher professionalism; perceptions of the role of the teacher; self-regulation in the teaching profession; collegiality in teaching; entry criteria; the development of teaching as a profession (national and international trends); progression paths in teaching (national/international trends).

Self-Check Exercise – 1
Q. List any three priority areas in educational research.

5.4 Summary
Dear learner, in this unit we have discussed the priority areas in educational research.

5.5 Glossary

Factor Analysis: A statistical technique that reduces a set of variables into a smaller number of factors, enhancing their comprehensibility in multivariate analysis.

Focus Group: A qualitative data collection strategy involving group interviews with a limited number of participants at once to gather insights on a specific topic.

Independent Variable: A variable controlled or whose value is manipulated by the researcher during experimentation. It remains unaffected or unchanged by other variables and, consequently, influences the dependent variable.

In-depth Interviewing: A data collection method employing open-ended interview questions to obtain detailed information.

5.6 Answer to Self-Check Exercise

Self-Check Exercise - 1
Answer: The three priority areas in educational research are:
1. Classroom research, pedagogic and subject didactic research, especially in upper secondary education

2. Universalization and Free & compulsory education
3. Vocationalization and Population Education

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5.8   Terminal Questions
1. Discuss the priority areas in educational research.

Unit – 6

Review of Literature: Purpose & Sources
Structure

6.1   Introduction

Dear learner, this unit deals with review of literature: purpose & sources.

6.2   Learning Objectives

After completing this unit, you will be able to;

- explain the concept of review of literature its purpose &sources.

6.3   Review of Literature: Purpose & Sources

A literature review is like a summary of all the research and theories out there on a specific topic. It's like a critical evaluation of all the books, articles, and other stuff you find on that topic. Sometimes, it's just a part of the research process, but sometimes it can even be a whole research project in itself. In a research paper or thesis, the literature review is like a super important summary of all the research that's been done before. It helps you figure out what questions you need to ask and what you need to research. A good literature review is like a well-organized puzzle. It's got all the pieces in the right place, it's clear and easy to understand, and it uses the right methods. A bad literature review is like a messy puzzle. It's got all the pieces in the wrong place, it's confusing and hard to follow, and it doesn't use the right methods. Different social scientists have different ideas about what a literature review is, but here's one of the most common definitions:

W.R. Borg said, "The literature in any field is like the foundation of all future work. If we don't build the foundation of knowledge by reviewing the literature, our work will be shallow and naive, and it will often duplicate work that has already been done better by someone else."

Charter V. Good, "The keys to the vast storehouse of published literature may open doors to sources

To tackle complex problems and come up with solid explanations, it's crucial to read widely and critically. This stimulates our thinking and helps us define the problem clearly. It also gives us a solid foundation for choosing the right approach and comparing our results.

John W. Best rightly noted that human knowledge is vast and accessible through books and libraries. Unlike other animals that start anew with each generation, we build upon past knowledge, enabling progress in all aspects of life.

Good, Barr, and Scates emphasized the importance of staying updated with the latest medical discoveries. Similarly, educators, researchers, and investigators should familiarize themselves with various sources of educational information to stay informed and make informed decisions.

In social sciences research, a literature review is super important for several reasons:

1. It helps researchers understand their study better by looking at what's already been done in the field. They can find out what theories, concepts, and research are relevant to their topic. This helps them figure out why their study is important and how it fits into the bigger picture.

2. By looking at what's been done before, researchers can find gaps or inconsistencies in the research. This helps them figure out what their study needs to do differently and why it's important.

3. Literature review helps researchers build a framework for their study. They can find theories, models, or frameworks that can help them understand their findings and make sense of the data.

4. It helps researchers choose the right methods for their study. They can learn from what other researchers have done and find the best way to collect and analyze data.

5. It helps researchers avoid doing the same thing twice. They can make sure that their study adds something new to the field and doesn't just repeat what's already been done.

6. It helps researchers make sure that the research they're doing is reliable and valid. They can check out what other researchers have found and make sure that their own research is based on solid evidence.

7. Supporting Argumentation and Discussion: Literature review is like a treasure trove of evidence and support for your arguments, interpretations, and discussions. It makes your research paper or thesis rock solid and super credible.

8. Identifying Trends and Emerging Issues: It's like being a detective in the field! Literature review helps you spot trends, emerging issues, or changing perspectives. This knowledge can guide your future research and keep the scholarly conversation going strong.

9. Broadening Perspectives and Insights: Dive into different literature and you'll open your eyes to a whole new world of ideas and viewpoints. It's like having a front-row seat to debates and controversies. This broader perspective makes your analysis and interpretation super rich and insightful.

10. Contributing to Knowledge Development: Literature review is like a superhero that helps build knowledge in the social sciences. It's the foundation for new research, advances in theory, and solutions to real-world problems.

In a nutshell, reviewing related literature is super important for social science research. It gives us a big picture of what's already been done, helps us figure out what theories and methods to use, makes our arguments stronger, and helps us push the boundaries of what we know.

Purposes of a Literature Review

In a research paper, the literature review sets the stage for your thesis. It can cover different areas, depending on your research question. Here are some common topics:

- - **Theoretical background:** This could be the past, present, or future of your research topic.

- - **Clinical practice:** This might be how things are done in the real world, either in the past or now.

- - **Methodology and research methods:** This explains how you'll be doing your research.

- - **Previous findings:** This shows what other people have already discovered about your topic.
- - **Rationale and relevance of the current study:** This explains why your research is important and how it will contribute to what we already know.

Hart (1998) outlines several key goals of a review:

Clarify what's been done and what still needs to be done.

Identify important variables related to the topic.
Summarize and gain a fresh perspective.
Explore the connections between ideas and practice.
Set the context of the topic or problem.
Justify the importance of the problem.
Improve vocabulary and understanding of the subject.

Understand the subject's structure.

Connect ideas and theory to real-world applications.
Identify used methodologies and techniques.
Place the research in a historical context to show familiarity with current developments.
Bruce W. Tuckman (1978) listed the following goals for the review:

- 1. Identify important variables.
- 2. Compare what's been done to what needs to be done.
- 3. Summarize existing studies to gain a broader perspective.
- 4. Determine the significance, relevance, and connection of the study to existing studies, as well as any deviations.
-

Edward L. Vockell (1983) highlighted two main purposes:

- 1. To place the hypothesis being examined in the research report in its proper context.
- 2. To provide readers with guidance on where to find more information and to establish the author's credibility by letting readers know that the researcher is aware of current and related topics.

In your research, you'll need different types of materials, like books, articles, and websites. These are called sources. They're grouped into three main categories: primary, secondary, and tertiary.

- **Primary sources** are original documents created for your research. They include letters, diaries, memoirs, autobiographies, official reports, patents, and research articles.

- **Secondary sources** are sources that analyze and interpret primary sources. They include academic journal articles (except empirical research articles or reports), conference proceedings, books (monographs or chapters' books), and documentaries.

- **Tertiary sources** are encyclopedias, dictionaries, handbooks, and atlases. They provide general information and summaries of other sources.

Primary Sources: Primary sources are original materials from the time period under study, uninterpreted and unevaluated. They are the initial formal presentation of results in physical, print, or electronic formats. Primary sources include original thought, discoveries, and novel information.

Examples of Primary Sources:

- * *°Literary Works:** Novels, short stories, poems, and other literary creations.
- * **Artifacts:** Artifacts such as coins, plant specimens, fossils, furniture, tools, clothing, and other objects from the time period of study.
- * *°Audio Recordings:** Audio recordings, including radio programs.
- * *°Diaries:** Personal diaries and journals.
- * *°Internet Communications:** Email communications and other internet-based documents.
- * *°Interviews:** Oral histories, telephone interviews, and email interviews.
- * *°Journal Articles:** Peer-reviewed journal articles published in academic journals.
- * **Letters:** Correspondence and letters.
- * *°Newspaper Articles:** Articles published in newspapers during the relevant time period.
- * *°Original Documents:** Official documents such as birth certificates, wills, marriage licenses, trial transcripts, patents, photographs, and other legal and administrative records.
- * *°Proceedings of Meetings and Events:** Records of conferences, symposia, and other meetings.
- * *°Organizational Records:** Records of organizations, government agencies, and their annual reports, treaties, constitutions, and other relevant documents.
- * **Speeches:** Oral speeches delivered at various events.
- * *°Survey Research:** Market surveys, public opinion polls, and other survey-based research.
- * *°Video Recordings:** Television programs and other video recordings.
- * **Artistic Works:** Artistic creations such as paintings, sculptures, musical scores, buildings, novels, and poems.
- * **Web Sites:** Web sites and online publications.

Secondary Sources:

Secondary sources are a bit more flexible than primary sources. They're usually written after the event, which gives us a better understanding of what happened. They're like interpretations and analyses of primary sources. Secondary sources aren't evidence themselves, but they're like

commentary and discussions about evidence. But here's the thing: what one person calls a secondary source, another might call a tertiary source. It all depends on the context.
Examples of secondary sources include:

- * Bibliographies (also considered tertiary);
- * Biographical works;
- * Commentaries and criticisms;
- * Dictionaries and encyclopedias (also considered tertiary);
- * Histories;
- * Literary criticism, such as journal articles;
- * Magazine and newspaper articles;
- * Monographs (excluding fiction and autobiographies);
- * Textbooks (also considered tertiary);
- * Websites (also considered primary).

Tertiary Sources:
Tertiary sources are composed of information that is a distillation and collection of primary and secondary sources.

- * **Almanacs**
- * **Bibliographies (also considered secondary)**
- * **Chronologies**
- * **Dictionaries and Encyclopedias (also considered secondary)**
- * **Directories**
- * **Fact books**
- * **Guidebooks**
- * **Indexes, abstracts, and bibliographies used to locate primary and secondary sources**
- * **Manuals**
- * **Textbooks (also considered secondary)**

A literature review is more than just a search for information. It involves finding and explaining the connections between the literature and your research area. The way a literature review is done can differ depending on the type of study, but the main goals stay the same.

Self-Check Exercise - 1
Q. What are main sources of review of related literature?

6.4   Summary
Dear Learner in this unit we have discussed the review of literature: purpose & sources in detail.
6.5   Glossary

Research Design: The comprehensive plan for data collection, answering research questions, and employing specific data analysis techniques or methods.

Research Hypothesis: A prediction of research study outcomes, often expressing the anticipated relationship between two or more variables.

Research Method: The approaches, techniques, and tools employed by the researcher to conduct a research study.

Research Proposal (Synopsis): A concise written plan outlining the research study's objectives, methodology, and expected outcomes.

Research Question: The specific inquiry sought in the research data to address, explore, or understand an aspect of the research study. It serves as a guiding principle, ensuring the researcher's focus on the study's various components.

Research Report: A detailed account of the research study's conduct, encompassing the research problem, objectives, data collection procedures, analysis methods, findings, results, and conclusions.

6.6   Answer to Self-Check Exercise

Self-Check Exercise – 1

Answer: The main sources of lliterature review are classified into primary, secondary and tertiary. The primary sources are letters/correspondence, diaries, memoirs, autobiographies, official or research reports, patents and designs, and empirical research articles. The secondary sources are academic journal articles (other than empirical research articles or reports), conference proceedings, books (monographs or chapters' books), and documentaries. The tertiary sources are encyclopaedias, dictionaries, handbooks, and atlas.

6.7   References/Suggested Readings

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6.8   Terminal Questions
1. Discuss the importance of review of related literature.

Unit – 7
Selection and Characteristics of Good Research Problem

Structure
7.1   Introduction
7.2   Learning Objectives
7.3   Selection and Characteristics of Good Research Problem
        Self-Check Exercise - 1
7.4   Summary
7.5   Glossary
7.6   Answer to Self-Check Exercise
7.7   References/Suggested Readings
7.8   Terminal Questions
7.1   Introduction
Dear learner, this unit deals the selection and characteristics of good research problem.
7.2   Learning Objectives
After completing this unit, you will be able to;
*   discuss the process of selection and characteristics of good research problem.
3.   Selection and Characteristics of Good Research Problem

Finding the right problem is the first step in research. A problem is like a question or issue that we want to dig into or solve. It's not always easy to find the perfect problem to research. Sometimes, we just have to ignore it, talk about it, or try to solve it. But having a clear vision and imagination can help us find the right problem. Research projects always follow a cycle: we start with a problem, and then we find a solution. Problems can be anything that bothers us, affects our goals, or affects our society. For example, why do students always perform poorly? That's a problem that we can research.

Research, as defined by Mouly (1978), involves systematically collecting, analyzing, and interpreting data to arrive at effective solutions to problems.. In the Research Process:

- Research Problem
- Literature Review
- Research Design
- Collection of Data
- Analysis & Interpretation
- Research Report

Problems should have in general theoretical, conceptual, contextual   justifications.

Factors to Consider in Selecting a Research Problem

When choosing a research problem for your study, there are a few things to keep in mind. These things will make your research process easier and help you stay motivated. Here are some things to think about when picking a research problem.

Interest: This is the most important thing to consider. Research can be a lot of work and time-consuming, so you need to be interested in what you're doing. If you're not interested, it'll be hard to stay motivated to write.

Expertise: Before you start researching, you need to make sure you know enough about the topic. Use the information you've learned and ask your research supervisor for help.

Data availability: If you need to collect information (like from journals, reports, or proceedings) before you can finalize your research title, make sure you have all the materials you need and in the right format.

Relevance: Always choose a topic that suits your interest and profession. Ensure that your study adds to the existing body of knowledge. Of course, this will help you to sustain interest throughout the research period.

Ethics: In formulating the research problem, you should consider some ethical issues as well. Sometimes, during the research period, the study population might be adversely affected by some questions.

Characteristics of Good Research Problem

A comprehensive research task requires significant effort. The success of a research endeavor depends on the selection of a suitable research topic. A well-crafted topic should be:

1. Clarified: Easily understandable to others, avoiding confusion and maintaining focus.
2. Well-defined and well-phrased: Clearly defined and easily understandable, with a single, precise meaning.

3. Simple: Straightforward and accessible to all, using simple words and avoiding technical jargon.
4. Properly titled: Adhering to established titling conventions, usually in title case format.
5. Relevant and impactful: Demonstrating relevance to the field and potential for knowledge advancement.

Good and Scates has given us some guidelines for choosing a problem:

It should be new and not too similar to other problems we've done.

It should be important for the field we're working in and relevant to what we're trying to achieve.

We should be interested in it, curious about it, and motivated to work on it.
We should have the skills and training to handle it.
We should have access to the data and methods we need.
We should have the equipment and working conditions we need.
The problem should be easy to understand and explain.
We should have someone who can sponsor us and help us with administrative tasks.
The problem should be safe and not too dangerous.

It should be worth the time and effort we're putting into it.

It should be something that we can actually solve.

Hildreth Hoke McAshan has come up with a way to figure out if a problem is worth solving. Here are some questions to ask yourself to help you decide:

- 1. Is this problem really important?
- 2. Is this problem interesting to others?
- 3. Is this a real problem, or just a made-up one?
- 4. Is this problem original and creative?
- 5. Am I really interested in finding a solution?
- 6. Can I come up with testable hypotheses from the problem?
- 7. Will I learn something new from this problem?
- 8. Do I understand how this specific problem relates to the bigger picture?
- 9. Can I pick a sample from which I can make generalizations to a larger group?
- 10. Can someone else replicate my study?
- 11. Will my proposed methods actually give me the information I want?
- 12. Is this study, including the results, practical?

The more "yes" answers you get, the better the problem is.

Choosing a great research problem is super important because it sets the stage for everything you'll do. Here are some things to keep in mind when picking a problem:

1. 1. It should matter: The problem should be important to you, your field, or society. It should help us learn something new or solve a real problem.
2. 2. It should matter to you: The problem should be interesting and exciting to you. If you're not passionate about it, you won't be able to put in the work to do a good job.

3. It should be possible: The problem should be something you can actually do. You don't want to spend too much time and money on something that's impossible to solve.

4. It should be clear: The problem should be easy to understand. You don't want to waste time trying to figure out what it means.

5. It should be new: The problem should be something that no one has ever done before. If you're just going to copy what others have done, you won't be doing anything new.

6. By following these tips, you can choose a research problem that's both important and exciting.

7. Researchability: Make sure the research problem is easy to study using the right methods and techniques. Can you study it with data? Can you collect and analyze the data well? Can you make sense of the results?

8. Ethical Considerations: Think about the ethical issues with the research problem. Are there risks to the participants? Do you need to keep their information private? Do you need to follow ethical rules? Make sure the research design respects the rights and well-being of everyone involved.

9. Scope and Manageability: Clearly define the research problem to avoid taking on a topic that's too big or complicated for the resources you have. Break down the problem into smaller, easier-to-handle research questions or goals that you can accomplish within the time you have.

10. Potential Impact: Think about the potential impact of your research. Will your study give you new ideas? Can it help make decisions? Can it guide practice? Can it inspire more research? Choose research problems that have the potential to make a real difference.

By carefully choosing a research problem that meets these criteria, you can build a strong foundation for doing rigorous and meaningful research that helps advance knowledge and answers important questions in your field.

Self-Check Exercise - 1

Q. List characteristics of good research problem.

7.4   Summary
In this unit we have studied the process of selection and characteristics of good research problem.

7.5   Glossary

Descriptive Field Notes: These notes provide detailed descriptions of the researcher's observations.

Descriptive Studies: Research conducted to characterize existing conditions without analyzing the relationships among variables.

Direct Observation: A data collection method that primarily relies on close visual inspection of a natural setting. Direct observation does not involve actively engaging members of the setting in conversations or interviews. Instead, the direct observer strives to maintain a level of unobtrusiveness and detachment from the setting.

Educational Resources Information Center (ERIC): Effect Size (ES): An index used to indicate the magnitude of an obtained result or relationship.

7.6   Answer to Self-Check Exercise

Self-Check Exercise - 1

Answer: A good research topic should have the following qualities.
- Clarity is the most important quality of any research topic. The topic should have to be clear so that others can easily understand the nature of your research.
- Well-defined and well-phrased research topic is a half guarantee of a successful research.
- The language of the research topic should have to be simple.
- The titling of the research problem should follow the rules of titling.
- Current importance should also be the consideration of the researcher while selecting a research topic.

7.7   References/Suggested Readings
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7.8   Terminal Questions
1. Discuss the process of selection and characteristics of good research problem.

Unit – 8
Variables: Meaning and Types
Structure

8.1   Introduction

Dear learner, this unit deals with variables: meaning and types.

8.2   Learning Objectives

At the end of this unit, you will be able to;

- discuss the meaning and types of variables.

8.3   Variables: Meaning and Types

A variable is anything that can change or vary, like a number, a characteristic, or a quantity. It can be measured or categorized and can change over time or between different people or groups. There are six main types of variables.

Dependent Variables: These are the things that change based on the independent variables. For example, if you use a new language teaching method, the students' scores on a test might change. The dependent variable depends on the independent variable.

Independent Variables: These are the things you can control in the experiment. You can change them or introduce them to see how they affect the dependent variable. For example, if you change the teaching method, the students' scores might change.

Intervening Variables: These are things that happen between the independent and dependent variables but aren't directly observable. They can be things like the students' thoughts and feelings about the language learning process. For example, if you use a new teaching method, the students' thoughts and feelings about the language learning process might change.

Moderator Variables: These are like sidekicks that change the relationship between the main variables. Unlike other variables that might mess things up, moderator variables are measured and taken into account. In language learning research, they can include things like a person's gender, age, culture, or how well they speak the language.

Control Variables: Language learning and teaching are super complex, so it's impossible to include everything in one study. So, we keep other variables constant, balanced, or out of the picture so they don't mess with the results. These controlled variables are called control variables.

Extraneous Variables: These are like sneaky factors in the research environment that can affect the dependent variables but aren't controlled. They can mess up the study's validity, making it hard to tell if the effects were caused by the main variables or something else. If we can't control them, we still need to think about them when interpreting the results.

Self-Check Exercise - 1
Q. What do you understand by dependent variables?

8.4   Summary
In this unit we have studied the meaning and types of variables in detail.

8.5   Glossary

Variable: In research, something that can be changed or altered during an experiment. Each variable that's being tested represents a different test condition. For example, if you're testing the effects of fertilizer on plant growth, the variable could be the amount of fertilizer used: like none, the normal amount, twice the normal amount, and five times the normal amount.

Weighting: A process used to make sure that statistics from a sample are representative of the whole population from which the sample was drawn. Most big surveys include weights and descriptive statistics from such surveys should be based on weighted data.

Validity: The degree to which data and results are accurate reflections of reality. Validity refers to the things being investigated, the people or objects being studied; the methods used to collect data; and the findings that are produced.

8.6 Answer to Self-Check Exercise

Self-Check Exercise – 1

Answer: It shows the effect of manipulating or introducing the independent variables. For example, if the independent variable is the use or non-use of a new language teaching procedure, then the dependent variable might be students' scores on a test of the content taught using that procedure. In other words, the variation in the dependent variable depends on the variation in the independent variables.

8.7 References/Suggested Readings

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8.8 Terminal Questions
1. Explain the meaning and types of variables in detail.

Unit – 9
Objectives: Primary, Secondary and Concomitant
Structure

9.1   Introduction

In this unit we will study Objectives and its type.

9.2   Learning Objectives

After completing this unit, you will be able to;

- discuss the concept of objectives and its type.

9.3   Objectives: Primary, Secondary and Concomitant

Objectives are the steps we take to answer our research questions or complete a specific list of tasks to achieve our project goals. They focus on how we plan to accomplish these goals and are usually achievable and realistic. Research objectives describe what we expect to achieve by a project and are often explained in simple terms, benefiting both the client and the researcher. They can be linked to a hypothesis or used as a statement of purpose in a study without a hypothesis. Even if the research's nature isn't immediately clear to the layperson from the hypotheses, they should be able to understand the research from the objectives. A research objective can guide the research activities and help researchers formulate hypotheses that can be tested in a research study. If the research is exploratory (aiming to describe what is rather than test an explanation for what is), a research objective will provide a sufficient guide.

Remember, objectives should be S.M.A.R.T:

- Specific: Be clear and precise about what you want to do.

- Measurable: Determine how you'll know when you've reached your goal.

- Achievable: Don't try to do too much. A less ambitious but completed objective is better than an over-ambitious one that you can't achieve.

- Realistic: Assess whether you have the necessary resources (time, money, skills, etc.) to achieve the objective.

- Time-constrained: Determine when each stage needs to be completed and consider whether there's time in your schedule for unexpected delays.

Research objectives are the goals you aim to reach through your research. They can be broad or specific. The broad goal is what you want to accomplish with your research project, like figuring out if a new vaccine should be added to a public health program.

The specific goals are the questions you want to answer with your study. They can be primary or secondary. For example, primary goals: To figure out how well the new vaccine protects people in a

study group by comparing vaccinated and unvaccinated people. Secondary goals: To study how much money this program costs and how much it saves.

In social sciences, research objectives are super important in guiding your research and getting meaningful results. Here are the reasons why research objectives are so important:

1. 1. They give us direction and focus. Research objectives clearly state what we want to achieve and what we want to learn. They help us stay on track and avoid getting sidetracked.
2. They help us choose the right methods. Research objectives tell us what kind of research we should do and how we should do it. They help us make sure that our research is accurate and reliable.
3. They help us prioritize our work. Research objectives tell us what's most important to us and what we should focus on first. They help us make the most of our time and resources.
4. They help us measure our success. Research objectives tell us what we want to achieve and how we'll know when we've done it. They help us stay motivated and keep going.
5. They make sure our research is relevant. Research objectives tell us what's important to people and what's important to society. They help us make sure that our research is useful and helpful.
6. They help us communicate our research. Research objectives tell us what we want to say and how we want to say it. They help us make sure that our research is clear and understandable.
7. They make our research more impactful. Research objectives tell us what we want to achieve and how we want to achieve it. They help us make sure that our research is meaningful and useful.
8. Ethical Considerations: Research objectives guide ethical considerations in research design and implementation. They make sure the research respects the rights and well-being of participants, follows ethical guidelines, and handles sensitive issues responsibly.
9. Sustainability of Research Efforts: Research objectives help in planning for the long-term sustainability of research efforts. They inform decisions about follow-up studies, extending research projects, or adapting methods based on initial findings and outcomes.
10. Continuous Improvement: Reflecting on research objectives allows researchers to learn from their experiences and improve future research endeavors. They provide a basis for critical reflection on research methods, limitations, and areas for further investigation.

In essence, research objectives are crucial components of social sciences research as they provide direction, structure, and purpose to the study. They ensure that research efforts are focused, systematic, and impactful, ultimately contributing to the advancement of knowledge and addressing societal issues.

Self-Check Exercise - 1

Q. What do you understand by primary research?

9.4   Summary

In this unit we have studied the concept of objectives and its types in detail.

9.5   Glossary

Raw Score: This is a score you get from a test, assessment, observation, or survey that hasn't been changed into another type of score like a standard score, percentile, ranking, or grade. By itself, a raw score doesn't tell you much about a subject.

Reflective Field Notes: These are notes the observer takes during and after observation. They're like their thoughts and reflections.

Relationship Study: This is a study that looks at how two or more things are related. One of the things might be a treatment (method) variable.

Reliability: This is how consistent scores are from an instrument. It's like how well the instrument measures what it's supposed to measure.

9.6   Answer to Self-Check Exercise

Self-Check Exercise - 1

Answer: Primary research is information gathered through self-conducted research methods, while secondary research is information gathered from previously conducted studies.

9.7   References/Suggested Readings

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Materials and Methods, New York, Harper and Row Publishers.
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9.8   Terminal Questions

1. Discuss the concept of objectives and its types in detail.

Unit – 10
Hypotheses: Meaning, Significance, Types and Formulation
Structure

10.1   Introduction

Dear learner, this unit deals with hypotheses: meaning, significance, types and its formulation.

10.2   Learning Objectives

At the end of this unit, you will be able to;

- explain the concept of hypotheses and its significance.
- discuss the types and formulation of hypotheses.

10.3   Hypotheses: Meaning, Significance, Types and Formulation

The word 'hypothesis' is made up of two words: 'hypo' and 'thesis'. 'Hypo' means 'tentative' or 'subject to verification', and 'thesis' means 'statement about the solution of a problem'. In simple terms, a hypothesis is a tentative statement about the solution of a problem. It's a guess that we can test and see if it works. Hypotheses are based on some reason or idea, and they help us understand the world around us. Sometimes, people call it a 'leap into the dark' because it's a guess, but it can also be a brilliant idea that leads to new discoveries. A hypothesis is a temporary idea that we accept as true based on what we know so far. Different experts have different definitions of a hypothesis, but here are a few:

* George, J. Mouly: "A hypothesis is an assumption or proposition that can be tested based on the computability of its implications with empirical evidence and previous knowledge."

* James E. Greighton: "It's a tentative supposition or provisional guess that seems to explain the situation under observation."

* Lungberg: "A hypothesis is a tentative generalization that needs to be tested. In its simplest form, it can be any hunch, guess, or imaginative idea that becomes the basis for further investigation."

* John W. Best: "It's a shrewd guess or inference that's formulated and provisionally adopted to explain observed facts or conditions and to guide in further investigation."

* Carmichael A.D.: "Science uses hypotheses to guide our thinking. When our experience tells us that a certain phenomenon happens after another, we conclude that they're connected and form an hypothesis about this relationship."

Goode and Han explain that a hypothesis is like a guess or a prediction that we can test to see if it's right or wrong. It's something we can expect to happen based on what we know so far.

Bruce W. Tuckman says that a hypothesis is like an expectation about events based on what we think the relationship between different things is.

Barr and Scates define a hypothesis as a temporary belief that we accept as true based on what we know about a phenomenon. They use it as a starting point for finding new information and when we have enough evidence, we can turn it into facts, principles, or theories.

In social sciences, research hypotheses are crucial for several reasons:

1. Direction and Focus: Hypotheses provide a roadmap for research, guiding researchers on what to find, predict, and how to conduct their studies.
2. Scope Narrowing: They help researchers focus on specific relationships or predictions amidst the vastness of social science research.
3. Testable Predictions: Hypotheses are testable guesses about how things will change, enabling researchers to gather evidence supporting or refuting them.
4. Theory Development and Validation: Testing hypotheses helps researchers assess the accuracy and usefulness of existing theories, leading to better theories and improved understanding.
5. Clear Communication: Hypotheses facilitate clear research explanations and summaries, enabling other researchers to build on their work.
6. Ethical Considerations: They ensure research focus and purpose, avoiding waste and potential unethical practices.
7. Statistical Analysis Basis: Hypotheses involving measurable variables support statistical tests, helping researchers draw conclusions and interpret data.

Research hypotheses in social sciences are not just a step, they're the heart of meaningful and rigorous research. They connect the researcher's goals to the evidence, help us learn more, and make sure our research matters.

Characteristics of Hypothesis

Here are some key characteristics of a good hypothesis:

- 1. It should match the facts you've observed.
- 2. It should be simple and easy to understand.
- 3. It should allow you to use deductive reasoning to reach conclusions.
  4. It should be clearly stated in words.
- 5. It should allow you to control the methods you use to test it.
- 6. It should make sure you have all the tools and techniques you need to test it.
- 7. It should consider all the different ways you can control the experiment.
- 8. It should make it easy to access the sample you'll be using.
- 9. It should clearly explain the role of each variable in the study.
- 10. It should clearly distinguish between theory, law, facts, assumptions, and postulates.

Nature of Hypothesis

Here are the main features of a hypothesis:

- 1. **Conceptual:** It's based on ideas and concepts, not just facts.
- 2. **Verbal:** It's a statement that can be understood and tested.
- 3. **Empirical:** It can be tested and proven or disproven through experiments.
- 4. **Referent:** It refers to something that can be measured or observed.
- 5. **Future-oriented:** It's based on what might happen, not what has already happened.
- 6. **Key to research:** It's the main focus of scientific research.

1. Hypotheses serve several important purposes. First, they act as a temporary solution to a problem, allowing researchers to start their investigation. Second, they provide a framework for understanding the problem and its potential solutions. Third, they guide researchers in focusing on relevant information and avoiding unnecessary data collection. Fourth, they help researchers draw conclusions based on empirical evidence. In essence, hypotheses are crucial tools for research, bridging the gap between the problem and the evidence that can solve it.

1. The hypothesis is like a roadmap that tells you what to look for and how to get the data.
2. It helps you decide on the best research design. It might suggest who to study, what tests to use, and other cool tools and techniques.
3. The hypothesis is like a superpower that helps you explore and explain the unknown facts.
4. It's like a blueprint that helps you draw conclusions.
5. Hypotheses are like little experiments that help you plan future research studies.

Types and Formulation of Hypotheses

Hypotheses exhibit diverse forms, with their structure influenced by specific functions. A working or tentative hypothesis is characterized as the most plausible explanation or derivable statement based on available evidence. The quantity and quality of evidence determine the form of hypotheses. In certain cases, the statistical treatment necessitates a specific hypothesis form.

The primary types of hypotheses are:

(a) Question: Some writers propose that hypotheses can be formulated as questions; however, there is no universally accepted consensus on this notion. At best, it represents the simplest level of empirical observation and fails to conform to most definitions of a hypothesis. Its inclusion is justified by its frequent occurrence in lists. The second reason is not necessarily related to whether a question qualifies as a hypothesis. In certain instances, simple investigations and searches can be effectively implemented by posing questions rather than categorizing hypotheses into acceptable/rejectable categories.

(b) Declarative Statement: A hypothesis can be developed as a declarative statement, which predicts an anticipated relationship or difference between variables. The anticipation of a difference implies that the hypothesis developer has examined existing evidence and concluded that a difference may be anticipated based on additional evidence.

An example of a declarative hypothesis is: H: There is a significant interaction effect of schedule of reinforcement and extroversion on learning outcomes. This hypothesis simply states the anticipated effect of the independent variables on the criterion variable.

(c) Directional Hypothesis: A hypothesis may be directional, indicating an anticipated direction in the relationship or difference between variables. The above hypothesis has been presented in a directional statement form as follows: H: Extroverts learn more effectively through an intermittent reinforcement schedule, while introverts learn better through a continuous reinforcement schedule. An evidently safe hypothesis would be "hypotheses that highly intelligent students learn better than low-intelligent students." The above hypothesis is in the directional statement form but necessitates evidence to establish the relationship between reinforcement and personality.

(d) Non-Directional Hypothesis: A hypothesis may be stated in the null form, asserting the absence of a relationship or difference between or among the variables. This form of null hypothesis is a statistical hypothesis that can be tested within the framework of probability theory. It is also a non-directional form of hypothesis.. The following are the examples of null form of hypothesis:

H0: There is no significant interaction effect of schedule of reinforcement and extroversion on learning outcomes.

H0: There is no significant relationship between intelligence and achievement of students.

In recent research endeavors in education and psychology, the employment or development of null hypotheses has gained prominence. A null hypothesis is tentatively proposed as the absence of a difference, based on evidence tested. If rejected, it indicates the presence of a difference, but the specific alternative or differences remain unknown. This approach eliminates the need for researchers to anticipate or provide justification for their conclusions or directional statements.

Furthermore, this method of hypothesis formulation does not introduce bias or prejudice. Researchers can maintain objectivity regarding the anticipated outcomes and findings. In essence, this constitutes a statistical hypothesis, specifically a null hypothesis, which is self-explanatory and translates to "zero hypotheses." Developing such a hypothesis is not a complex process, and it serves as a crucial step in reflective thinking research, preceding the second step of research.

A null hypothesis is particularly suitable for accommodating the objectives of inquiry and extracting relevant information. While it may not necessarily reflect the researcher's expectations, it is more concerned with the practicality and suitability of the null form as the most appropriate fit to the logic of chance in statistical knowledge or science.

The formulation of hypotheses serves several fundamental purposes in research, particularly in the humanities and social sciences:

1. Hypotheses provide a clear focus for research, articulating specific predictions or relationships that the researcher intends to investigate. This clarity facilitates the structuring of the research process, from defining research questions to designing methodologies.

2. Hypotheses are formulated to be testable, proposing specific outcomes or relationships between variables that can be empirically examined through observation or experimentation. This testability is essential for conducting rigorous and scientific research.

3. Hypotheses are often derived from existing theories or conceptual frameworks. Testing hypotheses enables researchers to assess the validity of these theories in diverse contexts or populations. Successful testing can either support, refine, or even challenge existing theories, contributing to the development of theories within the social sciences.

4. Hypotheses serve as a guiding principle for the collection and analysis of data. By testing hypotheses, researchers gather empirical evidence that either supports or refutes their predictions. This evidence forms the foundation for drawing conclusions and making informed interpretations about the phenomena under study.

5. Formulating hypotheses encourages critical thinking about the relationships between variables and the anticipated outcomes of research. It promotes a systematic approach to inquiry, where researchers meticulously design studies to ensure reliability, validity, and ethical conduct.

6. Clearly formulated hypotheses facilitate communication within the academic community. They provide a succinct summary of research objectives and findings, enabling other researchers to comprehend, critique, replicate, or build upon previous studies.

7. Hypotheses ensure that research is conducted with a clear purpose and plan. This minimizes the risk of conducting aimless or speculative research, which could result in resource waste or ethical concerns.

Hypotheses are super important in social sciences. They act as a roadmap for research, help us build theories, guide our experiments, and make sure our findings are clear and repeatable. They're like the backbone of the scientific process, helping us unravel the mysteries of social stuff.

Self-Check Exercise - 1

Q. List the types of hypothesis.

10.4   Summary
Dear Learner in this unit we have discussed the hypotheses (meaning, significance, types) and its formulation in detail.
10.5   Glossary

Hypothesis:A hypothesis is like a guess or a prediction about something. It's something we can test

to see if it's true or not.

Hypothesis Testing:Hypothesis testing is like a game of detective work. We have two hypotheses: the null hypothesis and the alternative hypothesis. The null hypothesis says there's no relationship between two things, while the alternative hypothesis says there is.

Independent Variable:An independent variable is like the boss of the experiment. It's something we change or control, and it affects the dependent variable. In the example of "gender" and "academic major," gender is the independent variable.

10.6   Answer to Self-Check Exercise
Self-Check Exercise - 1

Answer: The types of hypothesis are: Question form of Hypotheses, Declarative Statement, Directional Hypothesis and Non-Directional Hypothesis.

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10.8   Terminal Questions
    1. Explain the concept of hypotheses and its significance.
    2. Discuss the types and formulation of hypotheses.

UNIT - 11
SAMPLING
STRUCTURE:
11.0   Introduction
11.1   Learning Objectives
11.2   Concept of Population
        Self-Check Exercise-1
11.3   Concept of Sample
11.3.1 Sampling Unit
11.3.2 Sampling Frame
11.3.3 Sampling
        Self-Check Exercise-2
11.4   Summary
11.5   Glossary
11.6   Answers to Self Check Exercise
11.7   Suggested Readings
11.8   Terminal Questions

11.0   INTRODUCTION

The quality of research depends not only on the appropriateness of its methodology and tools but also on the effectiveness of its sampling strategy. Decisions related to sampling stem directly from the challenge of defining the target population for the research. Researchers must make these sampling decisions early in the planning phase. Practical limitations, such as time, budget, and

accessibility, often prevent researchers from collecting data from the entire population. As a result, researchers typically rely on a smaller group or subset of the population, ensuring that the findings can still be generalized to the broader population. This smaller group is referred to as the sample.

Experienced researchers typically start by defining the entire population and then narrow down to a sample, whereas less experienced researchers may focus on determining the minimum number of respondents needed for the study without first defining the total population. However, without understanding the full population, it becomes nearly impossible to assess whether the sample is truly representative.

Consider a scenario where a teacher, freed from her regular teaching duties for a month, conducts research on the abilities of 13-year-old students to perform science experiments. The research will involve three secondary schools, each with 300 students, for a total of 900 students. She is asked to use semi-structured interviews to collect data. Given her limited time, interviewing all 900 students is impractical, so she must choose a smaller sample. How should she decide which students to interview? Would 200 students be too many? Would 20 students be too few? Would interviewing only males or females provide an accurate picture of the student body? If she only interviews students considered "good at science" by their teachers, would that reflect the abilities of the entire group? Perhaps including students who struggle with or dislike science would provide a more balanced view. But if those students choose to skip the interviews, how can she still reach them?

Such questions are common when selecting a sampling strategy. Researchers must make judgments on five key factors in sampling:
1. The appropriate sample size.
2. Ensuring the sample is representative and aligns with the research parameters.
3. How to gain access to the sample.
4. The sampling strategy to be employed.
5. The nature of the research being conducted. Therefore, sampling is the process by which a relatively small number of individuals or measures of individuals, objects, or events is selected and analyzed in order to find out something about the entire population from which it was selected. It helps to reduce expenditure, save time and energy, permit measurement of greater scope, or produce greater precision and accuracy. Sampling procedures provide generalizations.

11.1   Learning Objectives
At the end of this unit, you will be able to:
- Define Target population, Sampled population , sample.
- Know the characteristics of a good sample.
- Describe the concept of Sampling, sampling unit and sampling frame.

11.2   CONCEPT OF POPULATION
The term *population* or *universe* refers to the entire set of observations or individuals that form the basis for a sample. This concept differs from its conventional use. For example, in a census, the population refers to the total count of people—men, women, and children.

In research, a population is defined as all members of a specific class, such as people, events, or objects, that meet particular criteria. For instance, in a study focusing on American adolescents, the population could be described as all boys and girls in the U.S. aged 12 to 21.

A population is a group of elements or cases that align with certain criteria and to which the study's findings apply. It's often called the *target population* or *universe*. The process of defining a population starts with the research problem and literature review, which provides a broad conceptual understanding of the population—such as seventh-grade students, first-year teachers, or principals. A more specific definition then follows, based on demographic factors known as *delimiting variables*. For example, a study on first-grade minority students might involve three key delimiting factors: the students' grade level (first grade), their age, and their minority status. Further specifics could include the geographic location, socioeconomic status, gender, type of community, and the kind of schools (e.g., public or private). Clarifying what "minority" means in this context is also important.

It's crucial to distinguish the *target population* from the *survey population* or *sampling frame*. While the target population is the broader group researchers aim to study, the survey population refers to the actual list of elements selected for the research. For instance, in a study on beginning teachers across India, the target population might include all new teachers in all schools across the country. However, the survey population could be restricted to a list of teachers from four specific states. Although the research aims to generalize findings to all beginning teachers, the results would be limited to those in the selected states, meaning generalizations should be made based on the survey population.Target population

The complete collection of observations we want to study. Defining the target population is an important and often difficult part of the study. For example, in a political poll, should the target population be all adults eligible to vote? All registered voters? All persons who voted in the last election? The choice of target population will profoundly affect the statistics that result.

Sampled population

The collection of all possible observation units that might have been chosen in a sample;

A population is all the elements in a defined set about which we wish to make an inference. Examples of target population vs. experimentally accessible population are heights of Chinese vs. heights of Shanghai residents.

Self Check Exercise - 1

Q 1.Population in educational research is defined as ——————————-.

11.3   CONCEPT OF SAMPLE

A sample refers to a subset of a larger population. For example, the students at Washington High School in Indianapolis represent a sample of American adolescents. These students are a smaller group within the broader population, as they are American citizens and fall within the age range of 12 to 21.

In statistics, a sample is defined as a smaller segment of a population that is studied to gain insights about the entire group (Webster, 1985). In studies involving people, a sample can be described as a group of respondents selected from a larger population for the purpose of a survey. A population, on the other hand, is the full set of individuals, objects, or items from which samples are drawn. For instance, a population could include presidents, professors, students, or books.

A sample consists of individual units selected from a sampling frame. It is the group of elements, or in some cases a single element, from which data are collected. While the phrase "the sample included" describes the characteristics of the sample, the sampling method is often specified with terms like "random sampling" or "stratified random sampling." These methods are detailed with examples from actual research in the following sections. It is essential for researchers to clearly define both the sampling procedure and the characteristics of the sample used in their study.

Characteristics of an Effective Sample

To ensure valid conclusions, a sample must possess certain essential characteristics:

1. **Representativeness:**
   The sample should accurately reflect the characteristics of the larger population. To achieve this, the researcher must avoid bias, and the data collection method must be appropriate.

2. **Adequacy:**
   The sample size should be sufficient—neither too large nor too small—and should align with the population size.

3. **Homogeneity:**
   The units selected for the sample should be similar in nature. If the sample is too heterogeneous, it will be difficult to make meaningful comparisons between the units.

4. **Independence:**
   The sample selection process should be such that the selection of one unit does not influence the choice of another. Each unit should be chosen based on its individual characteristics, without bias.

A well-chosen sample accurately represents the population from which it is drawn. The population is considered an aggregate of specific properties, while the sample is a smaller subset that reflects these properties.

An ideal sample is unbiased, meaning it is not influenced by the researcher's preconceived notions, assumptions, or personal opinions. Objectivity is key in the selection process, ensuring that subjective elements do not affect the sampling procedure.

A good sample is also precise, yielding accurate estimates or statistics without introducing errors. It is comprehensive in nature, closely linked to the study's purpose. While a sample may exhibit comprehensive traits, it may not necessarily represent the population well. A well-representative sample, however, will align with the true characteristics of the larger group.

Lastly, a good sample should be practical for the research, meaning it is feasible to gather and analyze within the constraints of the study.

➢   Some definitions are needed to make the notion of a good sample more precise.
Observation unit

An object on which a measurement is taken. This is the basic unit of observation, sometimes called an element. In studying human populations, observation units are often individuals.

11.3.1 SAMPLING UNIT

Sampling units are non-overlapping collections of elements from the population. The sampling unit can be the element.

A unit that can be selected for a sample. We may want to study individuals, but do not have a list of all individuals in the target population. Instead, households serve as the sampling units, and the observation units are the individuals living in the households.

11.3.2 SAMPLING FRAME

A list, map, or other specification of sampling units in the population from which a sample may be selected. For a telephone survey, the sampling frame might be a list of all residential telephone numbers in the city. For a survey using in-person interviews, the sampling frame might be a list of all street addresses. For an agricultural survey, a sampling frame might be a list of all farms, or a map of areas containing farms.

- Sampling frame is a list of sampling units.

11.3.3 SAMPLING

Sampling is indispensable to the researcher. Usually the time, money, and effort involved do not permit a researcher to study all possible members of a population. Furthermore, it is generally not necessary to study all possible cases to understand the phenomenon under consideration. Sampling comes to our aid by enabling us to study a portion of the population rather than the entire population.

Sampling is the act, process, or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population.

To make inferences about populations based on samples, we rely on inferential statistics, which allows us to estimate a population's characteristics by studying only a portion (or sample) of it. Instead of conducting a complete census of the entire population, we choose to obtain a sample for various reasons. For one, it is far less expensive to gather data from a smaller group rather than from everyone. However, it's important to recognize and address the potential risks associated with using samples. In this tutorial, we will explore different sampling methods. While some methods are more effective than others, all have the potential to produce samples that may be inaccurate or unreliable. We will learn strategies to reduce these risks, but it's important to understand that some level of error is inevitable when relying on samples, even though they offer significant convenience and cost savings.

Steps in Sampling

The first essential in sampling is the identification of the population to be represented in the study. If the researcher is interested in learning about the teachers in the St. Louis school system, all those who teach within that system constitute the target population. In a study of the attitudes and values of American adolescents, the target population would be all American boys and girls in the age range of 12-21, granted that adolescence is operationally defined as the period between ages I2 and 21.

However, since it is usually not possible to deal with the whole of the target population, one must identify that portion of the population to which one can have access--called the ***accessible population-and*** it is from this group that the researcher will take the sample for the study. The nature of the accessible population is influenced by the time and resources of the researcher. In a

typical attitude study, for example, a researcher might designate all adolescent boys and girls in California or just those in San Francisco as the accessible population.

From the accessible population, one selects a sample in such a way that it is representative of that population. For example, the researcher would have to sample from adolescents all over the state of California if California adolescents are identified as the accessible population. Or if adolescents living in San Francisco are the accessible population, then the sample would be drawn from this particular group.

Target Population → Accessible Population → Sample → Findings
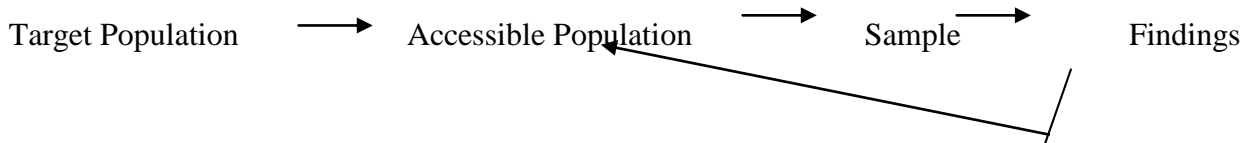
How safely can one generalize from a sample to the target population? If the sample selected is truly representative of the accessible population, then there is little difficulty in making this first step in the generalization process. The general principle is: If a sample has been selected so that it is representative of the accessible population, findings from the sample can be generalized to that population. For example, if one has selected a representative sample of California adolescents, then one could make generalizations concerning the attitudes and values of all adolescent boys and girls in California.

However, generalizing from the accessible population to the target population typically involves greater risk. The confidence that one can have in this step depends upon the similarity of the accessible population to the target population. In the example above, a researcher could have more confidence making generalizations about American adolescents if adolescents in several states throughout the country

are designated as the accessible population rather than those in California alone. In this way all sections of the United States would be represented and a more adequate sampling of attitudes and values would be possible.

It is true that one must make an inferential "leap of faith" when estimating population characteristics from sample observations. The likelihood that such inferences will be correct is largely a function of the sampling procedure employed.

Various sampling procedures are available to researchers for use in the selection of a subgroup of a population that will represent that population well and will avoid bias.

Self Check Exercise - 2

Q 1.What are the steps in sampling?

11.4   SUMMARY

Sampling is an important process in research which needs to be taken care of diligently as it has a scope of violation of research ethics. In this unit, we learnt about population, sampling frame, sampling unit and the process. As educationists, it will help us to understand our research, targeted population and the findings to our study.

11.5   GLOSSARY

Sampling: It is a process to take desired number of observations from a population.

Population: It is the entire group from which the requisite sample is taken to generalise the result upon which contains the specific characteristics.

Sampling Frame: It is the list of all units from which sample is taken.

11.6   Answers to Self Check Exercise.

Self Check Exercise - 1
Answer1: All members of well defined class of people
Self Check Exercise - 2
Answer1: 1. Target population finding 2. Accessible population 3. Sample

11.7 SUGGESTED READINGS

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11.8   TERMINAL QUESTIONS

Q.1.   What are the characteristics of a good sample?

Q.2.   What is the relation between population and sampling frame?

Q.3.   What is the concept of sampling in research?

UNIT - 12
METHODS OF SAMPLING
STRUCTURE:
12.0   INTRODUCTION
12.1   Learning Objectives
12.2   Methods of Sampling
      Self-Check Exercise-1
12.3   Summary
12.4   Glossary
12.5   Answers to Self Check Exercise

12.6   Suggested Readings
12.7   Terminal Questions
12.0   INTRODUCTION
In this UNIT, we shall study about the methods of sampling, differences between probability and non-probability sampling. We shall also study in deep the types of probability and non-probability sampling. It is very important to understand the requirement of the type of sampling which depends upon the nature of study and resources available.
12.1   Learning Objectives
After reading this unit, you will be able to:
-   Understand the types of probability sampling and non-probability sampling.
- Differentiate between probability and non-probability sampling.
- Discuss the concept of sampling error.

12.2   METHODS OF SAMPLING
The goal of sampling is to select a group of subjects that accurately represents the larger population or provides the specific information required. The level of representativeness depends on the sampling method used. I will begin by outlining various sampling techniques and then evaluate the advantages and disadvantages of each in terms of obtaining a sample that truly reflects the population.

Difference between Probability and Non-Probability Sampling

S.No.	Probability Sampling	Non-probability Sampling
1.	It is a method of sampling which gives the probability that a sample is representative of population.	In the absence of any idea of probability the method of sampling is known as non-probability sampling.
2.	Probability sampling is generally used in fundamental research in which the purpose is to generalize the results.	It is generally used in action researches in which one studies a class without any generalization purpose.
3.	It refers from the sample as well as the population.	There is no idea of population.
4.	Every individual of the population has equal probability to be taken into the sample.	There is no probability of selecting any individual.
5.	It may be representative of the population.	It has free distribution.
6.	Its observations (data) are used for the inferential purpose.	The observations are not used for generalization purpose.
7.	Inferential or parametric statistics are used.	Non-inferential or non-parametric statistics are used.

8.	There is a risk of drawing conclusion.	There is no risk for drawing conclusions
9.	It is based on Law of probability sampling i.e – Law of Statistical Regularity and – Law of Inertia of the Large Sample.	It is not based on law of probability sampling.

Probability Sampling

In social science and educational research, it is often impractical and unnecessary to measure every element in the population of interest. Instead, a smaller group of subjects or cases is typically chosen from the larger population. The aim is to select a sample that accurately reflects the population, ensuring that the characteristics observed in the sample also apply to the broader population. The most effective way to select such a sample is through probability sampling, a technique where subjects are chosen randomly in such a manner that the researcher knows the probability of selecting each individual from the population. Random selection ensures that every member of the population, or specific subgroups within it, has an equal chance of being included. If the sample size is sufficiently large, it is likely that even a small percentage of the population, represented by the sample, will provide an accurate portrayal of the entire population.

It should be noted, however, that there is always some degree of error in sampling, and that error must be considered in interpreting the results of the sample. In probability sampling this calculation can be made very precisely with some statistical procedures. Consider a population of 1,000 third-graders, from which you will select randomly 5 percent, or 50, to estimate the attitudes of all the third-graders toward school. If the attitude score was 75 for the sample of 50 subjects, 75 can be used to estimate the value for the entire population of third-graders. However, if another sample of 50 students is selected, their score might be a little different, say 73. Which one is more correct? Since all 1,000 students have not been tested to obtain the result we do not know for sure, but the results can be used to estimate the error in sampling. This is basically the technique that political polls follow when it is reported that the vote is 45 percent + 3. The plus or minus 3 is the estimate of error in sampling. There are many types of probability sampling procedures. You will probably encounter four types in educational research: simple random, systematic, stratified, and cluster.

Simple Random Sampling

A simple random sample (SRS) is the simplest form of probability sample. An SRS of size n is taken when every possible subset of n units in the population has the same chance of being the sample. SRSs are the focus of this chapter and the foundation for more complex sampling designs. In taking a random sample, the investigator is in effect mixing up the population before grabbing n units. The investigator does not need to examine every member of the population for the same reason that a medical technician does not need to drain you of blood to measure your red blood cell count: Your blood is sufficiently well mixed that any sample should be representative.

In simple random sampling, every individual in the population has an equal and independent chance of being selected for the sample. This method is typically used when the population is small, such as when names or numbers of all individuals are placed in a hat and drawn randomly. Alternatively, if each member of the population is assigned a unique number, a random number table can be used to select the individuals for the sample. However, this approach becomes less practical for large, unnumbered populations. For larger populations, computer programs are often employed. These programs assign numbers to each member of the population, generate random sample numbers, and then display the names of the individuals corresponding to those numbers.

Simple random sampling is illustrated in the following study of mothers' strategies for influencing their children's schooling.

Example: Simple Random Sampling

We interviewed a sample of 21 mothers of 8th class students from one middle school. The mothers were randomly selected from a list of 90 mothers provided by the principal of the school. (Baker and Stevenson, 1986, p. 157)

If a sample of size n is drawn from a population of size N in such a way that every possible sample of size n has the same chance of being selected.

$M = \Sigma x_i / n$ is the sample estimate of population mean, μ.

Systematic Sampling

In a systematic sample, a starting point is chosen from a list of population members using a random number. That unit, and every kth unit thereafter, is chosen to be in the sample.A systematic sample thus consists of units that are equally spaced in the list. Systematic samples will be discussed in more detail in Sections 2.7 and 5.5. Suppose you want to estimate the average amount of time that professors at your university say they spent grading homework in a specific week. To take an SRS, construct a list of all professors and randomly select n of them to be your sample. Now ask each professor in your sample how much time he or she spent grading homework that week—you would of course have to define the words homework and grading carefully in your questionnaire. In a stratified sample, you might classify faculty by college: engineering, liberal arts and sciences, business, nursing, and fine arts. You would then take an SRS of faculty in the engineering college, a separate SRS of faculty in liberal arts and sciences, and so on. For a cluster sample, you might randomly select 10 of the 60 academic departments in the university and ask

In systematic sampling, every nth element is chosen from a list of all individuals in the population, starting with a randomly selected element. For example, if 100 subjects are needed from a population of 50,000, every 500th individual would be selected. The first element is chosen randomly, which could be any number between 1 and 500. If, for instance, 240 is selected as the starting point, the first subject chosen would be the 240th on the list, the second would be the 740th, the third the 1,240th, and so on, until 100 subjects are selected. While systematic sampling is very similar to simple random sampling, it is often more convenient. However, a potential drawback arises if the list of cases in the population follows a specific pattern. For example, if a list of fourth-graders in a school is organized by classroom, with students ordered by ability from highest to lowest, a regular pattern could emerge (known as periodicity). If every nth individual aligns with this pattern, the sample would overrepresent a specific ability level and fail to accurately reflect the diversity of the entire population. Alphabetical lists, however, typically do not create periodicity and are often appropriate for systematic sampling.

Stratified Sampling

Stratified random sampling divides the population into subgroups called strata. An SRS is selected from each stratum, and the SRSs are selected independently. The strata are often subgroups of interest to the investigator, such as different regions or types of terrain. Elements in the same stratum tend to be more similar than randomly selected elements from the population, so stratification increases precision.

Stratified sampling is a modification of simple random or systematic sampling. It involves dividing the population into homogeneous subgroups and selecting subjects from each subgroup using simple random or systematic procedures. This is used primarily because it can make a sample more representative of the population than a sample taken from the population as a whole. This reduces error and means that a smaller sample can be chosen.

Stratified sampling ensures an adequate number of subjects from different subgroups. For instance, in a study of beginning elementary school teachers, simple random or systematic sampling might not yield enough male teachers to study differences. In such cases, the population of teachers is stratified into male and female teachers, and subjects are selected from each subgroup.

Two methods are used for selecting subjects from each stratum: proportional stratified sampling and proportional allocation. In proportional stratified sampling, the number of subjects selected from each stratum is based on the population's proportion with the characteristic forming the stratum. For example, if 5% of elementary teachers are male, 5% of the sample would also be male teachers.

The other method, proportional allocation, selects the same number of subjects from each stratum, regardless of the population's proportion. This ensures adequate representation of each stratum. For instance, if 10% of a population of 200 elementary teachers are male, a proportional sample of 40 would include only 4 male teachers. However, to focus on male teachers, all 20 male teachers could be included, and 20 female teachers randomly selected. This method is called disproportional stratified sampling because the number of subjects chosen from each subgroup doesn't reflect their proportion in the overall population. When using disproportional sampling, results from each stratum must be weighted to provide an accurate estimate for the entire population.

Stratified random sampling is illustrated in Figure 4.1. In this example, the population is first divided into three age groups and then further divided by gender. After the stratification by gender, random samples are drawn from each of the six subgroups.

Stratified random sampling

The population of N units is divided into subpopulations of N_1, N_2... N_h units which are non-overlapping so that $N_1 + N_2 + .. + N_h = N$. The subpopulations are called strata. A sample is drawn from each stratum. The sample is denoted as n_1, n_2, n_h. If a simple random sample is taken from each stratum, the whole procedure is called stratified random sampling.

When the population is heterogeneous, stratified sampling increases the precision in estimating population parameters. Breaking up the population makes each stratum homogeneous (measurement varies little among units) so that a small sample is needed to estimate the population characteristics of the stratum. These strata estimates can be combined into a precise estimate of the whole population.

$W_h = N_h / N$ is stratum weight.

$f_h = n_h / N_h$ is sampling fraction in the stratum.

M_{st} $= \Sigma N_{hh} / N$

$= \Sigma W_{hh}$ is the stratified sample estimate of population mean, μ.

If in every stratum, $n_h / n = N_h / N$, this means sampling fraction is the same in all strata. Such stratification is called stratification with proportional allocation of the n_h. Using proportional allocation, $M_{st} = \Sigma n_{hh} / n$

$N_{st} = N_{11} + N_{22} + N_{33} .. + N_{hh}$ is stratified sample estimate of population total, τ.

Cluster Sampling

In a cluster sample, observation units in the population are aggregated into larger sampling units, called clusters. Suppose you want to survey Lutheran church members in Minneapolis but do not have a list of all church members in the city, so you cannot take an SRS of Lutheran church members. However, you do have a list of all the Lutheran churches. You can then take an SRS of the churches and then subsample all or some church members in the selected churches. In this case, the churches form the clusters, and the church members are the observation units. It is more convenient to sample at the church level; however, members of the same church may have more similarities than Lutherans selected at random in Minneapolis, so a cluster sample of 500 Lutherans may not provide as much information as an SRS of 500 Lutherans.

When it is impossible or impractical to sample individual elements from the population as a whole, usually when there is no exhaustive list of all the elements, cluster sampling is used. Cluster sampling involves the random selection of naturally occurring groups or areas and then the selection of individual elements from the chosen groups or areas. Examples of naturally occurring groups would be universities, schools, school divisions, classrooms, city blocks, and households. For example, if there is a need to survey a state for the television viewing habits of middle school students, it would be cumbersome and difficult to select children at random from the state population of all middle-school students. A clustering procedure could be employed by first listing all the school divisions in the state and then randomly selecting 30 school divisions from the list. One middle school could then be selected from each division, and students selected randomly from each school. This is a multistage clustering procedure. Although cluster sampling saves time and money, the results are less accurate than other random sampling techniques.

A cluster sample is a simple random sample in which each sampling unit is a collection, or cluster, of elements. It is used when 1) a good frame listing population elements either is unavailable, unreliable, or costly; 2) the cost of obtaining observations increases as the distance separating the elements increases. For example, when sampling in the field in agricultural research, it is hard to do random sampling by running around. In quality inspection of light bulbs contained in boxes, light bulbs are the elements and the boxes can be the sampling units. Travelling within a city (to obtain a simple random sample of city residents) is more expensive than travelling in a city block (to get a cluster sample of city blocks as sampling units). The rational for choosing the unit size for cluster sampling is a decision on the unit that gives smaller sampling variance for a given cost or on the cost for a prescribed variance. Used as a general rule, the number of elements within a cluster should be small relative to the population size, and the number of clusters in the sample should be reasonably large.

$M_{cl} = \Sigma x_i / \Sigma m_i$ is the cluster sample estimate of population mean, μ, where Σx_i is the total of observations (sum of elements) in the ith cluster, and Σx_i indicates summing over i=1 to n sampled cluster totals; m_i is the size of ith cluster, and Σm_i indicates summing over i=1 to n sampled cluster sizes,.

Non-probability Sampling

In many research designs it is either unfeasible or unnecessary to obtain a probability sample. In these situations a non-probability sample is used. A non-probability sample is one in which the probability of including population elements is unknown. Usually, not every element in the population has a chance of being selected. It is also quite common for the population to be the same as the sample, in which case there is no immediate need to generalize to a larger population. In fact you will find that much of the educational research reported in journals, especially experimental studies, uses a group of subjects that has not been selected from a larger population.
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Convenience Sampling
Convenience sampling involves selecting participants based on their accessibility and willingness to participate. For instance, a professor studying college students might use their own university class, or teachers in a graduate program may serve as subjects. Similarly, principals attending a workshop, shoppers visiting a mall on a Saturday, or individuals responding to an advertisement can also form a convenience sample. However, generalizing findings from such a sample to a broader population is challenging, as the sample may not be representative. Additionally, convenience sampling can introduce bias. For example, if a study on the impact of college relies on alumni attending an alumni event, their perspectives may differ from those of the entire alumni population. Likewise, research on effective teaching conducted in a specific geographic region might yield different results compared to studies conducted in other areas.
Although we need to be very way of convenience samples, often this is the only type of sampling possible, and the primary purpose of the research may not be to generalize but to better understand relationships that may exist. Suppose a researcher is investigating the relationship between creativity and intelligence, and the only available sample is a single elementary school. The study is completed, and the results indicate a moderate relationship: Children who have higher intelligence tend to be more creative than children with lower intelligence. Because there was no probability sampling, should we ignore the findings or suggest that the results are not valid or credible? That decision seems overly harsh. It is more reasonable to interpret the results as valid for children similar to those studied. For example, if the school serves a low socioeconomic area, the results will not be as useful as those from a school that serves all socioeconomic levels. The decision is not to dismiss the findings but to limit them to the type of subjects in the sample. As more and more research accumulates with different convenience samples, the overall credibility of the results is enhanced.
Although it is not common for a researcher to state explicitly that a convenience sample was used, it will be obvious from the subjects sub section of the article. If some type of probability sampling procedure was used it will be described. Thus, in the absence of such particulars you can assume that the sample was an available one. The following examples are typical.
Purposive Sampling

In purposive sampling, also known as purposeful or judgmental sampling, researchers intentionally choose specific individuals or groups from a population based on their relevance to the study. This selection is made using the researcher's understanding of the population, ensuring that the chosen cases provide the most valuable insights into the research topic. For instance, when investigating effective teaching practices, it may be more insightful to observe highly experienced or exemplary teachers rather than a broad sample of all educators. Similarly, in a study on successful schools, interviewing key figures such as long-serving teachers and school principals can yield more

meaningful data. A real-world example of purposive sampling can be found in political polling, where certain precincts are selected to represent broader voting trends.

While purposive sampling is not commonly applied in quantitative research, it is a fundamental approach in qualitative studies. Various forms of purposive sampling are frequently utilized in qualitative research to ensure that the selected participants provide depth and richness to the study. Additional discussion on qualitative sampling methods is provided in Chapter 10.

Quota Sampling

Quota sampling is employed when a probability sample is not feasible, yet the researcher aims to obtain a sample that reflects the overall population. To achieve this, key demographic groups within the population are identified, and participants are then chosen non-randomly to represent each group. In educational research, quota sampling is frequently used to capture diversity across geographic regions or community types, such as urban, rural, and suburban areas. Typically, a state is divided into specific geographic zones, and participants are selected to ensure representation from each area. Similar to availability and purposive sampling, quota sampling relies heavily on the researcher's judgment in selecting participants, making it essential to interpret the findings with caution.

HOW SUBJECTS AND SAMPLING AFFECT RESEARCH

In reading and interpreting research you will need to be conscious of how the sampling procedures might have affected the results and how the characteristics of the subjects affect the usefulness and the generalizability of the results.

Knowledge of Sampling Procedures

To understand how sampling may affect research it is essential to know the characteristics of different sampling procedures. This knowledge will help you interpret the sample that is used. You should first be able to identify the sampling procedure and then evaluate its adequacy in addressing the research problem and in supporting the conclusions. It will be helpful to know the strengths and weaknesses of each sampling procedure, as summarized in Table 4.1.

Table 4.1: STRENGTHS AND WEAKNESSES OF SAMPLING METHODS

Method of sampling	Strengths	Weaknesses
Probability *Simple random*	1. Usually representative of the population 2. Easy to analyze and interpret results 3. Easy to understand	1. Requires numbering each element in the population 2. Larger sampling error than in stratified sampling
Systematic	1. 1, 2, and 3 above 2. Simplicity of drawing sample	1. Periodicity in list of population elements

Proportional stratified	1. 1, 2, and 3 of simple random 2. Allows subgroup comparisons 3. Usually more representative than simple random or systematic 4. Fewer subjects needed 5. Results represent population without weighting	1. Requires subgroup identification of each population element 2. Requires knowledge of the proportion of each subgroup in the population 3. May be costly and difficult to prepare lists of population elements in each subgroup.
Disproportional *stratified*	1. 1, 2, 3, and 4 of proportional stratified 2. Assures adequate numbers of elements in each subgroup	1. 1, 2, and 3 of proportional stratified 2. Requires proper weighting of subgroup to represent population 3. Less efficient for estimating population characteristics
Cluster	1. LOW cost 2. Requires lists of elements 3. Efficient with large populations	1. Less accurate than simple random, systematic, or stratified 2. May be difficult to collect data from all elements in each cluster 3. Requires that each population element be assigned to only one cluster

Non-probability *Convenience*	1. Less costly 2. Less time consuming 3. Ease of administration 4. Usually assures high participation rate 5. Generalization possible to similar subjects	1. Difficult to generalize to other subjects 2. Less representative of an identified population 3. Results dependent on unique characteristics of the sample
Purposive	1. 1,2, 3, 4. and 5 of convenience 2. Adds credibility to qualitative research 3. Assures receipt of needed information	1. 1,2, and 3of convenience
Quota	1. 1,2, 3, 4. and 5 of convenience 2. More representative of population than convenience or purposive	1. 1,2, and 3of convenience 2. Usually more time consuming than convenience or purposive

Self Check Exercise - 1

Q 1. Probability sampling is the one where the selection of sample is based on the principle of ———————————-.

12.3 SUMMARY

In this unit, we did sampling methods which are used to select items from the larger population. The various methods include simple random where each item has an equal chance of selection, and stratified sampling where population is divided into subgroups. Systematic sampling involves taking every n_{th} item from the sample, cluster sampling divides the population into clusters. Convenience sampling is based on accessible items. Each method has its own distinctness and must be used as per the nature and requirement of the research.

12.4 GLOSSARY

Probability Sampling: It is the method of sampling in which the sample is taken randomly and the probability of all the subjects to get selected is equal.

Non-Probability Sampling: It is the method of sampling where subjects are not taken randomly rather for the purpose of convenience.

Randomness: it is the property of a sampling method where every subject of sample has an equal and fair chance of being selection into the event without any bias.

12.5   ANSWERS TO SELF CHECK EXERCISE

Self Check Exercise - 1

Answer1: Randomisation.

12.6   SUGGESTED READINGS

McMillan, James H. (1996). Educational Research Fundamentals for the Consumer.(2nd ed.). New York: HarperCollins College Publishers

Jeffrey, A. Gliner & George A. Morgan (2000). Research Methods In Applied Setting: An Integrated Approach to Design and Analysis. Lawrence Erlbaum Associates: United States.

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Cohen, Louis, Manion, Lawrence & Morrison, Keith (2011). Research Methods in Education. Replika Press Pvt. Ltd.

12.7   TERMINAL QUESTIONS

Q.1   What is the difference between probability and non-probability sampling?

Q.2   What is the difference between a convenience and a purposive sample?

Q.3   When should a researcher use stratified random sampling?

Q.4   It is important to have a complete description of the sample to be able to

a. stratify the sample.

b. describe the population.

c. generalize the results

d. select informative subjects.

Q.5   Probability sampling is to systematic sampling as non-probability sampling is to

a. stratified sampling.

b. proportional sampling.

c. disproportional sampling.

d. purposive sampling.

UNIT- 13
SAMPLING ERROR

13.0   INTRODUCTION
To get a perfect sample is unfeasible in educational research, so to cope up such challenges we need to reduce sampling error by adopting certain techniques. In this way, we can get a good sample. In this chapter, we shall learn about the sampling error, the concept and the ways to reduce them.

13.1   Learning Objectives
After reading this unit, you will be able to:
  - Discuss the concept of sampling error.
  - To know how to reduce sampling error.

13.2   SAMPLING ERROR

When we make a guess about a whole group based on a small group, there's always a chance we're

wrong. Even if we pick a random group of people, they're not all the same. So, the average score of

one group might be different from the average score of another group from the same group. These differences are called sampling errors because we only looked at a sample, not the whole group.

Sampling error refers to the discrepancy between a population parameter and a corresponding sample statistic. For instance, if the mean of an entire population (denoted as μ) is known, along with the mean of a randomly selected sample from that population (represented as $\bar{X}$), the difference between these two values, $\bar{X} - \mu$, constitutes the sampling error (denoted as e). Mathematically, this can be expressed as $e = \bar{X} - \mu$.

For example, if the average intelligence score for a population of 10,000 fourth graders is $\mu = 100$, and a randomly selected sample of 200 students has a mean score of $\bar{X} = 99$, then the sampling error would be calculated as $\bar{X} - \mu = 99 - 100 = -1$.

Since researchers typically rely on sample statistics to estimate population parameters, understanding how samples deviate from their populations is fundamental to inferential statistics. Instead of directly measuring the difference between a sample statistic and the unknown population parameter, inferential statistics aims to estimate the expected variability among statistics derived from multiple random samples drawn from the same population. Given that each sample statistic serves as an estimate of the population parameter, any variations observed among these statistics are attributed to sampling error.

The Lawful Nature of Sampling Errors
Since random samples taken from the same population naturally differ from each other, one might wonder whether using a sample to draw conclusions about a population is any more reliable than mere guessing. The answer is yes, because sampling errors follow consistent and predictable

patterns. These patterns are governed by established statistical principles, derived through logical reasoning and validated through empirical evidence.

Although it is not possible to determine the exact error in any single sample, the overall behavior and extent of sampling errors can be anticipated in a broader sense. This can be particularly illustrated when examining sampling errors related to the mean.

Sampling Errors of the Mean

Whenever a sample mean ($\bar{X}$) is used to estimate a population mean (μ), some degree of sampling error is inevitable. Although, in practice, this estimation is based on a single sample, if multiple random samples were drawn from the same population and their means were calculated, we would observe that these sample means differ both from each other and from the population mean (if it were known). This variation occurs due to the sampling error associated with each sample mean as an approximation of the population mean. Extensive research on sampling errors of the mean has shown that they follow predictable statistical patterns.

The Expected Mean of Sampling Errors is Zero

If an infinite number of random samples were drawn from a population, the positive and negative sampling errors would balance each other, resulting in a mean sampling error of zero.

For instance, if the average height of a population of college freshmen is 5 feet 9 inches and multiple random samples are taken, some samples will have mean heights greater than 5 feet 9 inches, while others will have mean heights lower than that. However, over a large number of samples, these deviations will cancel each other out. If we were to compute the mean for each sample and then take the average of all these sample means, the result would be equal to the population mean.

Since positive and negative errors occur with equal probability, a single sample mean is just as likely to be an underestimate as it is to be an overestimate of the population mean. This characteristic makes the sample mean an unbiased estimator of the population mean, meaning it provides a reasonable approximation.

Sampling Error Decreases as Sample Size Increases

The size of a sample has an inverse relationship with sampling error—larger samples tend to produce more stable estimates of the population mean. When sample sizes are small, there is greater fluctuation in sample means, leading to increased sampling error. For example, the means from samples of 10 individuals are likely to vary much more than the means from samples of 100 individuals.

Returning to the height example, a random sample of four students could easily include three above-average freshmen and only one below-average freshman, leading to a higher sample mean. However, in a sample of 40 students, it is much less likely that 30 students would be above average while only 10 are below. As the sample size increases, the likelihood that the sample mean closely approximates the population mean also increases.

There is a defined mathematical relationship between sample size and sampling error, which is incorporated into inferential statistical formulas, as will be demonstrated later.

Sampling Error Is a Direct Function of the Standard Deviation of the Population.

The more spread or variation we have among members of a population, the more spread or variation we expect in sample means. For example, the mean weights of random samples of 25 each selected from a population of professional jockeys would show relatively less sampling error than the mean weights of samples of 25 each selected from a population of school teachers. The weights of professional jockeys fall within a narrow range, the weights of school teachers do not. Therefore,

for a given sample sire, the expected sampling error for teachers' weights would be greater than the expected sampling error for jockeys' weights.

Sampling Errors Are Distributed in a Normal OT Near Normal Manner around the Expected Mean of Zero.

Sample means that are close to the population mean occur more frequently than those that are farther away. As the distance from the population mean increases, the occurrence of such sample means decreases. Both theoretical principles and empirical studies have demonstrated that the distribution of random sample means tends to follow a normal or nearly normal pattern around the population mean.

Since sampling error represents the difference between a sample mean and the population mean, the distribution of sampling errors also follows a normal or approximately normal shape. These two distributions are fundamentally the same, except that the mean of the sample means aligns with the population mean, whereas the mean of the sampling errors is zero.

Interestingly, even if the population from which samples are drawn does not have a normal distribution, the distribution of sample means will still approximate a normal curve. For instance, in an elementary school with an equal number of children from ages 6 to 11, the overall age distribution would appear rectangular. However, if we randomly select samples of 40 students from this population, most sample means would cluster around the population mean of 8.5. Fewer samples would have means around 8 or 9, while sample means as extreme as 7 or 10 would be rare.

Reducing sampling error

Sampling error can be measured in different ways but in reality the error obtained is almost always an estimate of the actual error rather than the absolute measure of the error. If we want to calculate any true population we have to calculate the sample value first. Let us take the true value of population is k. But we don't know the true value of k. So we calculated some sample value of k. After that when we find the original value of k this has some difference compare to the true value. The difference between these two values is called error.

Normally sampling error means the difference between the sample value and the population value. The sampling error is the difference between static and population parameter.
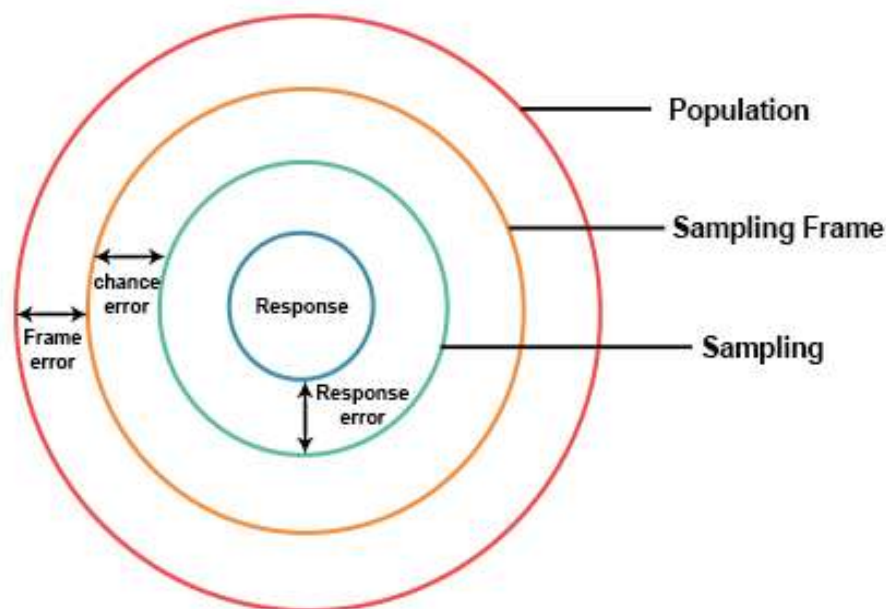
sampling error= frame error + chance error+ response error

There are mainly two ways by which this sampling error can be reduced. The ways are
1. Increasing sample size
2. Stratification
1) Increasing Sample Size

From a population, we can select any sample of any size. The size depends on the experiment and the situation. If the size of the sample increases, chance of occurrence of the sampling error will be less. There will be no error if the sample size and the population size coincide. Hence sampling error is in inverse proportion to the sample size.
2) Stratification:

When all the population units are homogeneous, it's very easy to get a sample that can be taken as a representative of the whole population, but the population may not be homogeneous, so, taking a perfect sample becomes impossible. In such conditions, to get a better representative, the sample design is modified. The population is divided into different groups called strata, containing similar units. From each of these stratum, a sub sample is selected randomly. Thus, all the groups are represented in the sample and hence the sampling error is very much reduced. The size of the sub-sample from each stratum is in proportion with the size of the stratum.

Self Check Exercise - 1
Q 1. Name any two ways to reduce sampling error.
13.3   SUMMARY
Sampling is one of the crucial stages during research process. There are certain rules and norms to conduct sampling which needs to be followed to have a good work. In such scenarios, it is very obvious to have sampling errors. In this chapter we have learnt the concept of sampling error and the ways to reduce them.
13.4   GLOSSARY
Sampling Error: These are the differences between the actual population and the sample taken in terms of characteristics and traits.
13.4   Answers to Self Check Exercise

Self Check Exercise - 1
Answer1: 1. Increasing sample size 2. Stratification.

13.5 SUGGESTED READINGS

McMillan, James H. (1996). Educational Research Fundamentals for the Consumer.(2nd ed.). New York: HarperCollins College Publishers

Jeffrey, A. Gliner & George A. Morgan (2000). Research Methods In Applied Setting: An Integrated Approach to Design and Analysis. Lawrence Erlbaum Associates: United States.

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Cohen, Louis, Manion, Lawrence & Morrison, Keith (2011). Research Methods in Education. Replika Press Pvt. Ltd.

13.6 TERMINAL QUESTIONS

Q.1 **What is sampling error? Explain the concept with some example.**

Q.2 **Discuss sample errors in mean.**

Q.3 **What is the lawful nature of sampling error?**

****

UNIT - 14
RESEARCH TOOLS-1
STRUCTURE :
14.0 Introduction
14.1 Learning Objectives

14.0   INTRODUCTION

The major tools of research in education can be classified broadly into the following categories.
  A. Inquiry forms

Questionnaire

Checklist Score-card

Schedule

Rating Scale

Opinionnaire

Attitude Scale

B. Observation

C. Interview

D. Sociometry

E. Psychological Tests

Achievement Test

Aptitude Test

Intelligence Test

Interest inventory

Personality measures etc**.**

In this UNIT we will discuss some of the tools of each categories.

14.1   Learning Objectives

After reading this UNIT you will be able to:
 – State different types of tools used for data collection.
 – Describe concept, purpose, construction and uses of rating scale.
 – Know   purpose, characteristics and types of attitude scale
 – Understand   purpose, types, characteristics and advantages of questionnaire.

14.2   RATING SCALE

A rating scale is like a secret code that helps us measure opinions or judgments about things. It's like a thermometer that lets us gauge how people feel about something, from super positive to super negative. This is especially useful when we can't easily measure things like how good or bad something is.

For instance, a question like *"How good was the performance?"* does not have a straightforward objective answer. A rating scale helps capture varying levels of quality by structuring responses

along a continuum. This allows for a more systematic recording of opinions, where different degrees of quality are represented along the scale.

Excellent   Very   good   Good   Average   Below   average   Poor   Very   poor
___|_____|_____|_____|_____|_____|_____|_____
The rating scale is one of the most widely used tools for evaluation, offering a diverse range of forms and applications. It is designed to assess various traits or characteristics by assigning values to specific aspects under consideration. This method helps measure the nature or intensity of particular attributes in individuals or phenomena using numerical values, descriptive terms, or qualitative labels.

There are three primary approaches to obtaining ratings: **Paired Comparison, Ranking, and Rating Scales.**

The earliest attempt to rate personality traits was the *man-to-man* technique, developed during World War I. In this method, a panel of evaluators compared each individual to a standard reference person, a process known as the **paired comparison approach**.

In the **ranking approach**, individuals within a group are compared to one another, and their relative standing is arranged in a hierarchical order.

The **rating scale approach**, which is the most commonly used, involves assigning a scale value to each characteristic being assessed. These individual ratings are then combined to generate an overall score, providing a systematic evaluation of the subject.

Purpose of Rating Scale:
Rating scales have been successfully employed to assess the following:
- Teacher performance and effectiveness
- Personality traits, anxiety levels, stress, and emotional intelligence
- School appraisal, including evaluations of courses, practices, and programs

Useful hints on Construction of Rating Scale:
A rating scale comprises three essential components:
  i) The entities or phenomena to be evaluated.
  ii) The scale of measurement employed to quantify these entities.
  iii) The individuals responsible for administering the ratings.
When constructing a rating scale, three key factors must be carefully considered:

1. **Selection of Subjects or Traits to be Rated**
   The aspects or traits being evaluated should be limited to only the most relevant and significant ones for the study. Typically, ratings are collected using five- to seven-point scales, as previously discussed.

2. **Components of a Rating Scale**
   A rating scale consists of two essential parts:

   ◦ **Instructions**: Clearly state the subject of evaluation and define the continuum on which ratings will be given.

- ◦ **Scale**: Establish the specific points that will be used to rate the subject or trait.
3. **Selection of Raters**

   - ◦ For non-technical assessments, such as general opinions, preferences, or easily observable traits, anyone can serve as a rater.
   - ◦ For technical evaluations requiring expertise, only knowledgeable and experienced individuals should be chosen. Experts in the field or representatives of the population where the scale will be applied should be selected as raters.
   - ◦ To enhance the reliability of the rating scale, multiple evaluators should be involved. The number of raters should be determined based on the rating context to ensure consistent and dependable results.

Use of Rating Scale :
Rating scales are employed to assess the veracity of numerous objective instruments, such as paper-and-pencil inventories of personality. They serve as valuable advantages in the following domains:
- Assisting in the composition of reports to parents
- Facilitating the completion of admission forms for colleges
- Identifying student requirements
- Providing recommendations to employers
- Enhancing comprehension of the child through additional sources
- Having a positive impact on the individuals being rated

Limitations of Rating Scale :
The rating scales have flaws, such as:

Raters avoid criticizing themselves by giving low ratings, so they tend to give high ratings to almost everything. Sometimes, they include overly generous raters. If raters give higher ratings due to these factors, it's called the generosity error of rating.

Self Check Exercise - 1
Q1. Rating scale is composed of ———————————————.

14.3 ATTITUDE SCALE
An attitude scale is a way to measure how someone feels about something, a group of people, or an institution. It's one of the ways we ask people about their opinions.

There are different ways to define an attitude. One way is that it's a learned emotional response that someone has towards something. Another way is that it's a tendency to see things a certain way. It's what someone believes or feels about something.

An attitude can be positive, negative, or neutral. Sometimes, people use the words "opinion" and "attitude" interchangeably, but they're not the same thing. An opinion doesn't usually lead to any action, while an attitude can make someone take action, either in a positive or negative way.

We can measure attitudes using questionnaires, but they're not very good at measuring how strong an attitude is. That's why attitude scales are important. They try to make questionnaires and questionnaires easier to use by defining an attitude in terms of a single thing. This way, all the questions can be graded as either positive or negative.

Purpose of Attitude Scale :

• Educational research uses these scales to assess individuals' attitudes on topics like co-education, religious education, corporal punishment, school democracy, linguistic prejudices, and international cooperation.

Characteristics of Attitude Scale :

Here are some key features for an attitude scale:

- 1. It should measure attitudes on a one-dimensional scale, ranging from extremely positive to extremely negative.
- 2. It typically uses a five-point scale, as we've discussed in the rating scale.
- 3. It can be standardized and have established norms.
- 4. It focuses on the attitude object rather than directly asking about the attitude on the subject.

Examples of Some Attitude Scale :

Two popular methods for measuring attitudes indirectly, commonly used for research, are:

- Thurstone Techniques of scaled values.
- Likert's method of summated ratings.

Thurstone Technique :

The Thurstone Technique is a way to measure opinions. Imagine you have a bunch of slips of paper with different opinions on them. A bunch of judges, who are totally impartial, sort these slips into eleven piles, from the most negative to the most positive. They make sure each statement is clear and easy to understand. The judges don't share their opinions, they just sort the slips based on what they say. They throw out any slips that cause a big disagreement among the judges. They count how many judges put each slip in each pile. Then, they calculate how many judges put each slip in each category and make graphs called ogives. These graphs show how many judges put each slip in each category. The Thurstone Technique is also called the technique of equal-appearing intervals.

Sample Items From Thurstone Type Scales :

Statement	Scaled value
I think this company treats its employees	10.4
Better than any other company does.	9.5
It I had to do it over again I'd still work for this company.	5.1
The workers put as much over on the company as the company puts over on them.	2.1

You have got to have pull with certain people around here to get ahead. An honest man fails in this company	0.8 217

The Likert Scale :

The Likert scale uses items for or against a proposition, with a five-point rating to indicate agreement or disagreement. Unlike the Thurstone method, it doesn't require judges to scale each item. It yields scores similar to those from the Thurstone scale and is superior.

First, collect statements about the topic from various people, ensuring a balanced representation of opinions. Test a few people to identify statements they agree with. Only those that align with the entire test should be retained.

Assign scores to each response. Positive statements are scored from highest to lowest (e.g., 5 for strongly agree, 1 for strongly disagree), while negative statements are scored in reverse order (e.g., 5 for strongly disagree, 1 for strongly agree).

The total of these scores on all the items tells you how much someone likes the topic. If there are 30 items, here are some possible score values:

30 x 5 = 150 - This is the best possible score.
30 x 3 = 90 - This is a neutral score.
30 x 1 = 30 - This is the worst possible score.

So, this method is called a summated rating. The total score of any individual will be between 30 and 150. Scores above 50 show that someone likes the topic, and scores below show that someone dislikes it.

Sample Items from Linkert Type Minnesota
Scale on Morale

Responses	Items
SA A U D SD	Times are getting better
SA A U D SD	Any man with ability and willingness to work hard has a good chance of being successful.
SA A U D SD	Life is just a series of disappointments.

SA A U D SD	It is great to be living in those exciting times.
SA A U D SD	Success is more dependent on lack than on real ability.

Limitations Of Attitude Scale :
In the attitude scale, several limitations may arise:

- An individual may express socially acceptable opinions while concealing their true attitude.

  They may lack self-awareness or real-life experiences to determine their genuine stance. The Likert scale positions may not be equally spaced, and statements may not be equally valued. Respondents may not accurately react to short statements without context. In the absence of anonymity, individuals may respond to align with their desired impression rather than their actual feelings.

Despite these limitations, the attitude scale remains the most suitable tool for measuring attitudes and beliefs in social research until more precise measures are developed.

Self Check Exercise- 2
Q1. Thurstone technique is also known as ————————-.

14.4   QUESTIONNAIRE
Questionnaires are forms people fill out to answer questions, collecting information from a group. They typically have a set of questions with written answers, categorized into facts and opinions, though some may include both.

Purpose :
The questionnaire is a treasure hunt to gather information from various sources. It's especially

useful when you can't meet everyone in person or when you don't need to know their personalities.

Types :
Questionnaire can be of various type on the basis of it's preparation. They are like:
- Structured v/s Non Structured
- Closed v/s Open
- Fact v/s Opinion

Structured v/s Non-Structured Questionnaire :
The structured questionnaire has definitive, concrete, and directed inquiries, while the non-structured questionnaire is often used in interviews and guides. It may include partially completed questions.

Closed v/s Open Questionnaire :

Questions that require short check responses are known as restricted or closed-form type questions. For instance, they provide for marking a yes or no, a brief response, or checking an item from a list of responses. In such cases, the respondent is not permitted to write their own response but must select from the predetermined options. Conversely, an increase in open-ended questionnaires allows respondents to respond freely in their own words. Many questionnaires also incorporate both closed and open-ended questions. The researcher selects the appropriate questionnaire type based on the specific requirements of their study.

Fact and Opinion :

In the case of a factual questionnaire, the respondent is expected to provide information based on objective facts, without any reference to their personal opinions or attitudes towards those facts. Conversely, in the case of an opinion questionnaire, the respondent is expected to provide information based on their own opinions and attitudes towards the facts.

Planning the Use of Questionnaire :

To make the most of a questionnaire, it's important to take your time planning it out. Don't rush into giving it out right away. Make sure you have a clear plan of action, including costs, production, organization, a time schedule, and any necessary permissions. When designing a questionnaire, keep these things in mind: it should be easy to understand, relevant, and have a clear purpose.

Characteristics of A Good Questionnaire :

- * Make sure it covers important topics that will pique people's interest.

- * Only ask questions that you can't get from other sources.

- * Keep it short and to the point, but make sure it's comprehensive.
- * Make it look appealing and easy to understand.
- * Give clear and complete directions.
- * Organize the questions in a logical way, starting with general questions and moving to more specific ones.
- * Avoid using double negatives or asking two questions in one.
- * Try to avoid questions that might be embarrassing or annoying.
- * Make sure the questionnaire can be used to analyze the data later.

- * Write down all the questions and make sure they're clear and easy to follow.
- * Use the questionnaire appropriately and follow up with the respondents.

When is it appropriate to use a questionnaire for research?
- Questionnaires are versatile tools that work best in specific situations. They shine when used with a large number of respondents, when straightforward information is needed, when standardized data is required, when time permits delays, when resources allow for printing and postage, and when respondents can read and understand the questions.

Designs of Questionnaire :

Following the construction of questions based on its characteristics, the questionnaire should be designed with the following essential routines:
- Background information about the questionnaire.
- Instructions to the respondent.
- The allocation of serial numbers and Coding Boxes.

Background Information about the Questionnaire

The researcher must provide sufficient background information about the research and questionnaire. Each questionnaire should have a cover page with information about:

- Sponsor
- Purpose
- Return address and date
- Confidentiality
- Voluntary responses
- Thanks

Instructions to the Respondent :

It's crucial that respondents are given clear instructions at the beginning of the questionnaire to let

them know what's expected of them. For each question, we should provide specific instructions that match the different question styles throughout the questionnaire. For instance, we can use tick marks and circles to indicate the correct answers.

The Allocation of Serial Numbers :

Whether you're dealing with a small or large number of people, a good researcher needs to keep

good records. That's why each questionnaire should be numbered. The serial number helps you keep track of everything and makes it easy to find what you need. It can also help you figure out when the questionnaire was distributed, where it was sent, and who might have received it.

Coding Boxes :

When designing a questionnaire, consider the following to prevent complications during coding:

- - Position coding boxes neatly on the right-hand page.

- - Allocate one box for each answer.

- - Identify each column in the complete data file below the appropriate coding box.

-

Additionally, be cautious about the questionnaire's length, appearance, question wording, presentation order, and question types.

Criteria of Evaluating a Questionnaire :

You can assess whether your questionnaire is standard or not based on the following criteria:

- It should provide comprehensive information relevant to the research area.
- It should provide accurate information.
- It should have a satisfactory response rate.
- It should adhere to ethical principles and be feasible.

Like all tools, it also has some advantages.

Advantages of Questionnaire :

Questionnaires are super cost-effective. They can give you a ton of research data in terms of materials, money, and time.

Here are some of the great things about questionnaires:

- * They're easy to set up.

- * They give you standardized answers.
- * They encourage people to fill out pre-coded answers.
- * They can cover a wide range of topics.
- * They help you do a deep dive into the research.

Here are a few drawbacks of using a postal questionnaire:

- 1. It's reliable and valid, but it can be slow.
- 2. Pre-coding questions might make people hesitant to answer honestly.
- 3. Pre-coded questions could potentially bias the results towards the researcher.
- 4. It's hard to check if the answers are truthful.
- 5. It's not suitable for people who can't read or are very young.

Self Check Exercise - 3

Q1. Questionnaire's types are based upon.

14.5   SUMMARY

The investigator selects appropriate instruments, commonly called tools and techniques, for collecting new, relevant data for a research study. Primary research tools include inquiry forms (rating scales, attitude scales, questionnaires, semantic differential scales), observation, interviews, social measures, and psychological tests (aptitude tests, inventories). Rating scales assess personality, attitude scales measure feelings or beliefs indirectly, questionnaires gather information from diverse sources in written form, and observation and interviews are techniques for data collection.

14.6 GLOSSARY

Scale: It is the quantitative way of defining and grouping variables in research.
Questionnaire: It is the list of questions used to collect information about the subject.
Evaluation: It is process of assessing the phenomenon and provide feedback.

14.6 ANSWERS TO SELF CHECK EXERCISE

Self Check Exercise - 1
Answer1: Instruction and point scale.
Self Check Exercise - 2
Answer1: technique of equal appearing intervals.
Self Check Exercise - 3
Answer1: Structured vs Non-Structured, Closed v/s Open ,Fact v/s Opinion.

14.7   SUGGESTED READINGS

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14.8   TERMINAL QUESTIONS

Q.1   What is attitude scale? Explain it's purpose and Characteristics.

Q.2   Define attitude. Explain Likerts scale to measure attitude.

Q.3   State the characteristics of a questionnaire.

Q.4   Write short notes on:

(a) Closed and open questionnaire.

(b) Structured and Non-Structure questionnaire.

(c) Fact and Opinion.

UNIT- 15

RESEARCH TOOLS- 2

15.0   Introduction

15.1 Learning Objectives

15.2   Interview

      Self-Check Exercise-1

15.3   Sociometry

      Self-Check Exercise-2

15.4   Summary

15.5   Glossary

15.6   Answers to Self Check Exercise

15.7   Suggested Readings

15.8   Terminal Questions

15.0   INTRODUCTION

In this unit, we'll explore research tools, concepts, and data collection methods. Every research project needs factual information or new data from various sources. To collect crucial data systematically, follow a process to ensure reliability and validity. Different devices, instruments, and appliances are used to check new data. Specific data collection instruments are essential for each research type.

Choosing the right tools is crucial for success. Different tools suit various information and purposes. Research students should learn about available tools, their nature, advantages, disadvantages, and effective usage. A systematic approach to complex or scientific tasks is called a technique.

15.1   Learning Objectives

Upon completing this unit, you will possess the following knowledge and skills:

–   **Describe the significance, types, and advantages of conducting interviews.**

- **Understand the essential requirements for conducting effective interviews.**
- **Gain familiarity with sociometry.**

15.2 INTERVIEW

Interviews are a great way for project researchers to gather information. They're not just casual conversations; they're structured conversations based on assumptions and understandings about the situation. Some people call them oral questionnaires, but they're much more than that. Questionnaires involve indirect data collection, while interviews involve direct data collection from people in person. People are more likely to share confidential information in a friendly and rapport-building setting than they are to write it down.

Research interviews should be planned and organized carefully. They're not just random conversations; they're structured conversations based on a specific agenda. The researcher should get the subject's consent before conducting the interview, and the interviewer should treat the words of the interview as "on the record" and "for the record." The interviewer should not use the information for any other purpose besides the research purpose. The discussion should be focused on the specific topic being investigated, and the agenda should be set by the researcher.

Importance of Interview :

Whether large-scale or small-scale, the choice between interviews and questionnaires depends on resources and data collection goals. Interviews are useful for gathering emotions, experiences, and feelings, especially sensitive topics or individuals with limited abilities. They provide detailed data and ensure valid questions. Interviews can also be used as follow-ups, complements, or with other tools to corroborate facts. While common, interviews can be used in historical, experimental, and case studies.

Types of Interview :

Interviews vary in purpose, nature and scope. They may be conducted for guidance, Interviews can be conducted for therapeutic or research purposes. They can be done with just one person or with several people. Here are some different types of interviews:

Structured Interview:

In a structured interview, the interviewer has a set list of questions and answers. It's like a questionnaire that you ask someone face-to-face. The researcher has a list of questions that everyone has to answer, and the answers have to be from a list of choices. This type of interview is very formal and follows a strict plan.

Semi-Structured Interview:

In a semi-structured interview, the interviewer also has a list of things they want to talk about and questions they want to ask. But there's some flexibility in the order of the topics. The interviewee gets to talk about their thoughts and ideas more freely. The answers are open-ended, and the interviewer wants the interviewee to explain things in more detail.

Unstructured Interview:

In an unstructured interview, the focus is on the interviewee's thoughts and feelings. The researcher tries to be as unobtrusive as possible. The researcher introduces a topic or theme and then lets the interviewee talk about their own experiences and feelings. It's a good way to learn more about complex issues because it gives the interviewee a chance to express themselves freely. It also allows for deeper investigations.

Single Interview:

A single interview is a common type of semi-structured or unstructured interview. It's just one person talking to another person. It's easy to set up and it helps the researcher find specific ideas from specific people. It's also easy for the interviewer to control the situation.

Group Interview:

A group interview is when multiple people talk to each other at the same time. It can be a good way to get different perspectives on a topic. It can also be a good way to encourage people to share their thoughts and feelings.

In a group interview, more than one person, usually four to six, participates. It may seem challenging to gather everyone and share opinions simultaneously. However, a group interview is not just a chance for the researcher to ask questions to a single person. It involves interaction and discussion at the group level, allowing for the sharing of diverse information and viewpoints.

According to Lewis –

―Group interviews have some cool advantages over one-on-one interviews. They can help us find out what everyone thinks, encourage people to share their ideas, check if our research is on track, and make sure our answers are trustworthy.

But there are also a few downsides. Sometimes, quieter people don't get a chance to speak up. And if one person dominates the conversation, it can be hard to hear everyone's thoughts. The worst part is that whatever opinions are shared in a group interview are accepted, no matter what anyone else thinks. Private opinions don't really matter.

Focus Group Interview :

This interview technique is super popular. It involves a small group of people, usually six to nine, discussing non-sensitive and non-controversial topics. The interviewer starts the conversation with a prompt, trigger, or stimulus to guide the discussion. The participants can express themselves freely, but the interviewer helps them stay focused. This method emphasizes collective views over individual opinions and focuses on specific events or experiences rather than general equality.

Requirements of a Good Interview :

Here are some key elements of a good research interview:

Proper preparation: Make sure you're well-researched and know what you're looking for.

Skillful execution: Be confident and engaging, and ask thoughtful questions.

view :

The following actors must be determined in advance of the actual interview:

- The purpose and information required should be clearly defined.
- The most appropriate interview type for the purpose should be determined.
- A systematic outline and framework should be prepared.
- Planning should be made for recording responses.

Execute the interview:

- - Establish rapport.
- - Collect information with a stimulating discussion.
- - Lease a recording device without distracting the interviewee.

Recording and Interpreting Responses:

- - Record responses using a tape recorder.
- - Note responses simultaneously or immediately after they occur.
- - Sometimes, researchers directly interpret responses instead of recording them.

Interviews have several advantages:

Deep Information: Interviews are great for getting detailed information on specific topics. You can dig deeper into the subject, explore different angles, and follow up on important points for a while.

Insights: With the right questions and people to talk to, you can gain valuable insights and understand things better.

Simple **Equipment:** All you need for an interview is a good conversation and a notebook.

Informant Priorities: You can tailor the interview to the informant's interests, opinions, and ideas. They get to share their thoughts and feelings freely.

Flexibility: Interviews can be adjusted as needed. If you change your mind about a question or direction, you can easily do so.

Validity: Since you're talking to the person directly, you can check the accuracy and relevance of the information as you collect it.

High Response Rate: Interviews are usually scheduled at a convenient time and location, which makes it easier for people to participate.

Therapeutic: Interviews can be a positive experience for both the informant and the researcher. It's a more personal way to gather information, and people often enjoy talking about their ideas to someone who's genuinely interested.

However, there are a few disadvantages to interviews:

Time-consuming: Interviews can take a lot of time, especially if you're talking to multiple people or if you need to follow up on a lot of points.

Subjectivity: Interviews can be subjective, and it's hard to ensure that you're getting the same information from everyone.
Analyzing data can be a real challenge, especially when compared to questionnaires. With questionnaires, you have the data ready for analysis right from the start, whereas with interviews, you have to transcribe and code the interview data after collecting it.

Here are some of the challenges associated with interview analysis:

Non-standard responses: Interviews often produce responses that don't fit into a pre-set structure, making it difficult to categorize and analyze them.

Lack of reliability: Interviews can be subjective and inconsistent, as the interviewer's identity and the interviewee's mood can influence their responses.

Interviewer effect: The interviewer's presence can influence the interviewee's behavior, leading to biased or incomplete responses.

Inhibitions: Recording interviews can make people feel uncomfortable or self-conscious, which can affect their honesty and openness.

Privacy concerns: Interviewing can infringe on the interviewee's privacy, which can cause discomfort or distress.

Cost: Interviewing can be expensive, especially if you're interviewing people from different locations.

Despite these challenges, interviews are still widely used in research and non-research settings. They can be a valuable tool for collecting data and gaining insights into people's opinions and behaviors. For example, interviews were used in a study to identify the traits and essential qualities that make a successful teacher.
Self Check Exercise - 1
Q 1.In structured interviewed, the questions and their pattern is ————-.

15.3 SOCIOMETRY

Sociometry comes from the Latin words 'socius' meaning companion and 'metrum' meaning measure. So, sociometry is all about measuring how connected people are. It can be used to figure out how people behave in groups and even to make positive changes happen. Jacob Levy Moreno came up with the term sociometry and did the first long-term sociometric study from 1932 to 1938 at the New York State Training School for Girls in Hudson, New York.

Moreno thought sociometry was all about figuring out how groups work and where people fit in. He said, "Sociometry is like a science that looks at how groups are formed and how people are

organized inside them." He believed that groups have hidden structures like alliances, subgroups, beliefs, and ideas that shape them. He also talked about the 'stars' of the group, which are the most important people.

Sociometry is all about how people are connected. Moreno thought society was made up of smaller groups called social atoms, which are made up of all the important people in someone's life, real or imagined, past and present.

Sociometry is all about how people make choices in their relationships. When people get together, they make choices about where to sit or stand, who they think is friendly and who not, who's the most important person in the group, who's rejected, and who's left out. As Moreno said, "Choices are the most important thing in all our relationships, whether we know why we make them or not. They don't have to be clear or logical, they don't have to be based on reason, and they don't need any special explanation. They just have to be true to who we are. They're a basic part of being human." (Moreno, 1953, p. 720).

Sociometry means 'companion measure.' Moreno created it as a way to measure how people interact with each other. He wanted to create a society where everyone could reach their full potential to love, share, and be honest. By making choices more obvious and active, he hoped people would be more spontaneous, authentic, and organizations and group structures would become clearer and more lively. Sociometry helps us understand how people make choices, what they're attracted to, and what they reject. It also has ways to show these choices and help us explore and improve the dynamics of relationships.

Meaning and purpose of sociometry -
Sociometry is like a special tool that helps us understand how people interact with each other in a group. It's like a map that shows us how people connect and work together towards a common goal.

Moreno, the guy who invented sociometry, said it's all about studying how people behave and how they make choices when they're together. He believed that these choices are important for building strong relationships and achieving success as a group.

Sociometry helps us measure how connected people are and how well they work together. It can also help us figure out if there are any problems in the group and how to fix them. By using sociometry, we can create a more positive and productive work environment.

Sociometry lets us use both formal and informal research data to change how organizations work. By tapping into the informal networks, we can unlock the creativity, leadership, and innovation that's hidden there. This makes group members happier and gets better results.

For sociometric interventions to work, we need participants to think about their choices in interactions. We want to understand why they make those choices and the feelings behind them (like attraction and repulsion). By making these choices visible, we can measure and observe how

they affect the group. This helps group members see the structures their choices create. They can then evaluate it and make changes if they want.

It can be uncomfortable for some people to share their personal motivations and reasons for choices or not choosing. But the value of change and refreshing relationships often outweighs this discomfort. Many people are relieved to hear the reasons for being chosen or not chosen, which they might have imagined before. When these processes are done respectfully, group members gain a lot of satisfaction from sharing the information. This releases creativity and spontaneity.

Branches of sociometry

Sociometry has two main branches**: research sociometry and applied sociometry**. Research sociometry is like a social experiment where groups explore the social connections between people. They use specific criteria, like who you want to sit next to at work or who you go to for advice, to understand these connections. Sometimes, it's called network explorations. Research sociometry looks at how people relate to each other in small groups and larger groups, like organizations and neighborhoods. Applied sociometrists use different methods to help people and groups review, expand, and improve their social networks. Both fields aim to make people and groups more spontaneous and creative.

Concept of Sociogram and sociomatrix

Sociometry is like a social map that helps us understand how people interact in small groups. It's like a network analysis, where we draw lines to show the connections between individuals.

When we ask group members to choose others based on specific criteria, we can see how everyone in the group makes choices and explains why. This gives us a picture of the networks inside the group. We can represent these networks as drawings, like maps, or as tables or matrices, called sociomatrices.

One of the cool things about sociometry is the sociogram. It's a way to graphically represent people as points and the relationships between them as lines. Moreno, the guy who came up with sociometry, also wrote a journal called Sociometry.

Teachers love sociograms because they're the tools we use to actually apply sociometry in the classroom. They show us how people are connected and help us understand how the group works. This knowledge can help teachers make better decisions about group management and curriculum.

Sociometry can also be helpful for teachers who work with students who are socially withdrawn or isolated. We can use sociometry to find out who the other students would like to interact with the targeted students. This can help us assign groups and arrange seating in a way that encourages more social interaction.

Sociometry isn't just for psychology, sociology, and anthropology anymore. It's also being used in schools to help teachers understand how students interact and how they see themselves in the classroom.

Applications to the Classroom

Teachers understand that their students are not just a collection of individuals, but a group with its own structure and dynamics. They recognize patterns of sub-groups, cliques, and friendships within the class. Some students are more accepted by the group than others, while some are rejected. These factors influence how the group responds to learning situations and the teacher's management strategies.

This quote beautifully summarizes the importance of sociometry in the classroom. It also explains what sociometrists aim to achieve by studying groups in social settings. They want to understand how people interact within groups and how this affects learning and development in the classroom.

For group work, sociometry can be a valuable tool to reduce conflicts and improve communication. It allows the group to see itself objectively and analyze its own dynamics. It's also useful for assessing the dynamics and development of groups involved in therapy or training.

Sociometric criteria for making choice-

Choices are always made, and there are different ways to make them. Sometimes, we make choices based on our feelings, like if we like someone or not. Other times, we make choices based on facts, like if someone has the skills we need.

Criterion Selection

Choosing the right criterion is crucial for the success of a sociometric intervention. Just like in any data collection in the social sciences, the answers you get depend on the questions you ask. Any question will get you information, but unless you ask the right question, the information might be confusing, distracting, or irrelevant to the goal of the intervention.

A good criterion should present a clear and meaningful choice to the person being surveyed. Other criteria include the Rule of adequate motivation, which says that every participant should feel like the experiment is in their own interest and that it's an opportunity for them to become an active agent in their life situation. Another criterion is the Rule of gradual inclusion of all extraneous criteria, which means that the criteria should be added slowly and carefully.

The criterion should be like a surgeon's knife - most effective when it clearly separates the material of interest. When people respond to the question, they will choose based on their own interpretation of the criterion. These interpretations, or sub-criteria, for this particular question could include things like whether they want someone who works hard, is a power broker, is amiable, or belongs to a minority group. A clear statement of the criterion will help reduce the number of interpretations and increase the reliability of the data.

Principles of Criterion Selection

The criterion should be as straightforward and unambiguous as possible.

Respondents should have some practical experience with the criterion, whether past or present (in Moreno's terminology, they are still "primed" for it). Otherwise, the questions will not elicit substantial responses.

The criterion should be specific rather than general or vague. Vaguely defined criteria evoke vague responses.

When feasible, the criterion should be practical rather than hypothetical.

A criterion is more effective if it has the potential for practical implementation. For instance, the question "Whom would you choose as a roommate for the year?" has greater potential for practical application than the question "Whom do you trust?"

Moreno suggests that the ideal criterion is one that aligns with the life goals of the subject. "If the test procedure is identical with a life-goal of the subject, he can never feel himself to have been victimized or abused. Yet the same series of acts performed of the subject's own volition may be a 'test' in the mind of the tester" (Moreno, p. 105). For example, assisting a college freshman in selecting an appropriate roommate exemplifies a sociometric test that aligns with the subject's life goals.

"It is easy to gain the cooperation of the people tested as soon as they come to perceive the test as an instrument to bring their wills to a broader realization, that it is not only an instrument for exploring the status of a population, but primarily an instrument to bring the population to a collective self-expression in respect to the fundamental activities in which it is or is about to be involved." (Moreno, 1953, pp. 680-681).

As a general rule, questions should be future-oriented, indicate how the results will be utilized, and specify the boundaries of the group (Hale, 1985). Finally, the criteria should be designed to maintain an appropriate level of risk for the group, considering its cohesion and developmental stage.

Sociometric assessment techniques/ Methods

Sociometric assessment techniques, which have been around since the 1930s, include peer nominations, peer rankings, and sociometric rankings. In peer nominations, kids in a group or classroom anonymously tell each other who they like and don't like to play with. For example, they might list their three best and three worst friends. Another way to do peer nominations is to give kids a list of their classmates and ask them to pick one or two who fit certain descriptions, like who they like to play with or who's most likely to be alone during recess.

For early readers, there's a peer nomination method that uses pictures with an adult reading the items aloud. The kids can then pick a child who fits the description by giving them a smile or frown face. Another variation is the class play, where kids act out different roles in an imaginary play. This might be a better way to find out who's popular or not in school because the roles can be seen as more secretive.

For each method, you can add up the nominations for each kid and use the results to figure out who's most liked or disliked by their peers.

There are two other ways sociometric techniques can be used. These are peer ratings and sociometric rankings. Peer ratings involve giving a list of kids' names in the group or classroom and rating things like "The most fun to play with," "The least fun to play with," and "Has the most friends." The ways people rate can vary, usually from 3 to 5 points on a scale like "Agree," "Neutral," or "Disagree." In contrast to peer nominations and ratings, sociometric rankings are done by an adult, usually the teacher who's seen the kids in different places like the classroom, playground, and cafeteria. In this method, teachers rank the kids on things like social standing.

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Each of these methods has its pros and cons. Researchers found that both peer ratings and adult rankings seem to be pretty good at figuring out how kids stand in the social world. Peer ratings and adult rankings seem to be more reliable and stable, so they might be better than peer nominations. But there's a big issue with all of these methods: social validity. This means how well the assessment works, how accepted it is, and if it can hurt people. There's been a lot of controversy and ethical concerns about using these methods, especially when it comes to negative peer nominations. People worry that kids might compare their responses and feel bad about themselves if they're not liked by their peers. This has led to a decline in the use of these methods, especially in schools. But researchers haven't found any strong evidence that these methods actually hurt kids who are being rated or the kids who are rating them. So, sociometric assessment is still used as a way to learn more about kids' social relationships.

Implication of Sociomatric Assessment for Educational Practices
Sociometric assessment is commonly used in schools to figure out if a child needs special education or extra help with social skills. Kids who have learning problems, mental retardation, attention deficit disorders, or autism spectrum disorders, like Asperger's, can benefit from this assessment and intervention to improve their social skills. Even kids in regular classes who are shy, rejected, bully others, or just don't have good social skills can get help from this assessment.

Most of the old-school sociometric assessment methods aren't used in schools anymore because people don't like them. Even though these methods have been shown to work in research, schools don't think they're useful because they don't give specific labels for special education or specific data that can help teachers figure out how to help the kids. Other sociometric assessment measures, like rating scales, are used more often because they give more specific information that can be used to figure out who needs special education and how to help them.

Sociometric rankings are a classic way to assess social behavior in schools. Teachers rank their students based on their social behavior issues, which can be internalizing (like depression, anxiety, and social withdrawal) or externalizing (like aggression, conduct problems, and hyperactivity). This initial screening helps teachers identify kids who might need extra help. Once they're identified, these kids get a rating scale or other method to figure out how bad their social problems are. If they have issues, they get more testing to figure out what's wrong and get help, like social skills training. Researchers say this method works well in real-world settings.

Understanding kids' and teens' peer relationships is crucial in schools for several reasons. First, it helps us understand how they learn social skills as they grow up. Researchers have found that sociometric assessments can help us figure out how kids rank in their social groups and predict whether they'll have positive or negative social outcomes. Making friends and having good social interactions are important for kids' social development and how they interact with others, including in school. Kids who don't have good peer and adult relationships often have negative social and

emotional effects that can last into adulthood. These effects can include lower grades, more kids dropping out of school, depression, anxiety, low self-esteem, feeling bad about themselves, withdrawing from social situations, having fewer good job opportunities, and acting out aggressively or being criminals. Studies show that at least 10% of kids have consistent negative peer relationships. So, many kids with not-so-great social relationships might be at risk for developing behavioral and emotional problems. Kids who don't have good social skills or who are bullied are also at risk. Kids with disabilities often have trouble with social skills and negative views of others, which puts them at even higher risk.

Because of these possible negative outcomes, it's important to assess kids' and teens' social skills in schools. Research shows that by figuring out how kids' social standing and skills develop, we can better understand the behaviors of kids who are successful and unsuccessful in social situations. Researchers use both classic sociometric assessments and social skills assessments to gain a better understanding of different social types and behaviors. These behaviors can help us understand kids' and teens' social skill problems and can help us design and study social skills assessments and interventions.

Sociometry Test-An Example-Sociometry is a technique that involves asking group members to choose who they'd like to associate with in a specific situation. For example, in a school setting, students might be asked to choose who they'd like to sit next to.

Here's a general process for using sociometry:

- 1. Identify the group you want to study.
- 2. Decide on the criteria for the test.
- 3. Build rapport with the group members.
- 4. Gather sociometric data.
- 5. Analyze and interpret the data.
- 6. Share the results with the group members, either individually or in a group setting.

7. Develop and implement action plans based on the results.

The number of choices allowed depends on the size of the group. Different levels of preferences are also assigned to each choice.

For instance, let's say you want to find out how people in a work group feel about each other. Each person is asked to choose three people they'd like to work with on a group assignment. The levels of choices are labeled as 1, 2, and 3.

Another example is when you're with a group of kids and they're asked to choose one person to sit next to them. You can show your choice by placing your right hand on the person you pick. Move

around the room as you need to make your choice. The only rules are that you can only choose one person and that you must choose someone.

You can repeat this exercise several times in a few minutes, using different criteria each time. This exercise helps you understand how people make choices and how different criteria can affect the results.
In sociometry, the person who gets the most "hands-on" attention is called the sociometric star for that particular criterion. Other sociometric relationships include mutuals, where two people pick each other; chains, where person A picks person B who picks person C, and so on; and gaps or cleavages when clusters of people have chosen each other but no one in any cluster has chosen anyone in any other cluster.

This "hands-on" exercise can be really helpful for teaching a group about sociometry and the real-world nature of informal organizations. While the group is in each pattern, the consultant can ask the group to describe the pattern, explain how it reflects real life, and suggest what the group needs to do to close any gaps. Participants learn quickly and clearly about the informal organization that underlies their formal organization. As one participant said, "It shows how we really feel, but we don't say it very often."

Creating a sociomatrix for a small group like this one is easy, but when the group has more than about five or six people, the clerical work and calculations can get really tedious and prone to errors. With a large matrix, finding mutuals can feel like a migraine headache. Luckily, computers exist to automate all the tedious calculations involved in creating a sociomatrix of up to 60 people. The software not only creates the sociomatrix but also several useful group and individual reports.
Validity of Sociometry
Sociometry, a tool used to measure social interactions, has been studied by Jane Mouton, Robert Blake, and Benjamin Fruchter. They found that the number of choices people have in sociometric tests can predict performance in areas like productivity, combat effectiveness, training ability, and leadership. Interestingly, the more choices people receive, the less likely they are to engage in behaviors like accidents or disciplinary charges.
Limitations of sociometry

Moreno says there's a big difference between what people say and what they do. Before proposing any social program, sociologists need to understand the group's real dynamics.

Sociometry is not often used in schools because teachers can't easily recreate it in their classrooms. But studies on aggression and school violence show why sociograms are so important.

Research shows that people often use secret language that only they understand, which can make it hard to talk. Sociometric assessment is like measuring how people interact in a group. It can tell you how well someone is doing in social situations and how they fit in with their peers.

School-based sociometric assessment often looks at how kids are liked, accepted, rejected, and respected by their peers. Some methods measure how kids think about each other, while others involve teachers, parents, and kids themselves.

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Sociometric assessment has been around since the 1930s and was first published in the journal Sociometry. In the 1950s, many books were written about it, and sociometric measurements were often used in research and school assessments of social relationships. But in the 1960s and 70s, sociometric procedures became less common because of the development of social behavior rating scales and ethical concerns about using peer nomination methods with kids.

Self Check Exercise - 2

Q 1. Sociometry is a method of measuring —————————-.

15.4   Summary

An interview is a face-to-face conversation where the interviewer asks questions to gather information from the interviewee. It's particularly useful for talking to young children, people who can't read, those who are not very smart, and those who are different. Sociometry is a way of studying social status, structure, and development by measuring how much people accept or reject each other in groups. Franz says sociometry is a way of figuring out how social groups work by measuring how people like or dislike each other. It's a way of studying how people choose, talk to, and interact with each other in groups. It's all about how people like or dislike each other in groups.

In this method, the person being interviewed is asked to choose one or more people based on certain criteria to find out who they would like to spend time with.

15.5   GLOSSARY

Interview: it is the process of asking questions through conversion in order to get data from the subject.

Sociometry: It is the study of relationship between individuals or within a group.

15.6   Answers to Self Check Exercise.

Self Check Exercise -1

Answer1: Fixed.

Self Check Exercise- 2

Answer1: Social relationships.

15.7   SUGGESTED READINGS

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15.8 Terminal Questions
Q.1   Explain different types of interview for the purpose of research
Q.2   Write short notes on: (a) Importance of Interview. (b) Requisites of a good interview.
Q.3   Prepare items using Rating scale, Interview and Questionnaire for a research proposal.
Q.4   Discuss the application of sociometry in educational research.

UNIT - 16
ETHICAL ISSUES IN EDUCATIONAL RESEARCH
STRUCTURE
16.0   Learning Objectives
16.1   Introduction
16.2   Ethical Issues in Research
          Self-Check exercise-1
16.3   Summary
16.4   Glossary
16.5   Answers to Self Check Exercise
16.6   Suggested Readings
16.7   Terminal Questions
16.0   INTRODUCTION
Research is a continuous and rigorous process which requires a researcher to dig deep into a problem. During this process, the researcher has to counter a lot of dimensions associated with the problem. It includes problem finding, making hypothesis and Learning Objectives, sampling, tool selection, data collection, analysis and editing. During this whole grilling process, the researcher has to abide by certain rules and norms which we call as ethics in research. To conduct a systematic research, understanding of ethical issues is vital to make sure that our research does not violate the norms of research. For instance, a researcher is conducting a research to know the educational problems of tribal students of secondary classes in Himachal Pradesh. To conduct this study, researcher must include Kinnaur, Chamba and Lahaul & Spiti as these are tribal dominated districts. If not done so, the research will not produce the actual result which is a violation of research ethics.
16.1   Learning Objectives
After reading this unit, the student will be able to
   - Define ethical issues in research.
   - Understand different types of ethical issues in research.
   - Apply the research ethics in research.

16.2   ETHICAL ISSUES IN RESEARCH
INFORMED CONSENT
Informed consent is the willingness of an individual or the population to be a part of the sample. It is the voluntary participation of people in the research after knowing all the aspects of the concerned research. The main thing is that the researcher has to inform all the consequences and risks associated with the research to the participant. The researcher is not at all allowed to force the participant to take part in research.

Informed consent is participation of people in the research after fully understanding the research and related risks. For instance, a study is being conducted to know the psychological and emotional issues of LGBT students in degree colleges of Himachal Pradesh. To make this research fruitful and productive, the LGBT population must be taken in consideration. Now, in our society LGBT is a sensitive issue as they face discrimination, and weirdness in almost all public activities. In this research, there are possible risks associated such as discrimination, violence, homelessness, gender identity and others. Here, a researcher cannot force anybody to take part in the research and must convey the possible risks and consequences to the participant. Only then the sample must be taken from the participant.

PRIVACY AND CONFIDENTIALITY
It means that all the information that is being transacted by the participant during the process of sampling must be preserved well and not shared anonymously. In a research, researcher must respect the privacy and dignity of the participant. Many a times, it happens that the issue of research is sensitive and possesses certain risks and harms to the participant. To tackle this and to ensure a good sample, the participant must be taken into consideration that his/her identity and the data given will be kept secured. In case, such norms are not being followed it may pose harms and risks to the participant.

Privacy in research is very important for protecting participants' personal data and information, thereby ensuring ethical standards. Researcher must obtain informed consent, make the identity anonymous and keep the data safe in electronic storage devices with password protection. Violation of privacy and confidentiality may lead to legal repercussions.

BIASNESS
It is a situation where personal judgements of researcher or participants overcome the actual research, thereby leading to a distort research. There are lot of reasons of biasness in research including convenience, personal orientations, not following procedural techniques during data collection or literature review and others.

Bias in research is deviation of results or interpretations made in personal capacities. Some common type of biases are measurement bias, selection bias and conformation bias.

To minimise bias, researchers must follow procedural methods and techniques at every step of research. Some of the measures include randomisation, peer review and blinding to ensure objectivity, reliability and validity.

PLAGIARISM

Plagiarism in research means when someone presents another person's ideas, words, pr work as their own without proper attribution. It poses a serious threat to academic integrity and can have serious consequences, including penalties, loss of reputation, and legal actions. The most common form of plagiarism is using someone else's work and claim it as own original piece of work.

Today, we have many artificial intelligence software which gives information in seconds and people use such software to write their thesis and dissertation like chatgpt. Such kind of work comes under plagiarism as there is no creativity of the researcher. There have come may softwares to detect the plagiarised material even extracted using the artificial intelligence. Thus a researcher should stay genuine, original and give citations to others' work if used.

Self Check Exercise - 1

Q 1. Informed consent is ——————————————————————-.

16.3 SUMMARY

Ethics are of utmost importance while doing academic writing in the absence of which the researcher would have to face serious repercussions. In this chapter, we learnt about some issues concerning ethics in research. Now, as a researcher we tend not to make such mistakes by following research ethics.

16.4 GLOSSARY

Ethics: It is the belief of what is morally right in some context.

Bias: It is a feeling of favour or disfavour without fairness.

16.5 ANSWERS TO Self Check Exercise

Self Check Exercise - 1

Answer1: Conveying all the information, risks and consequences related to research to participant before making him/her to participate in the research.

16.6 SUGGESTED READINGS

Bulmer, M. (1982) Social Research Ethics, London: MacMillan.

Cardasco, F. and Gatner, E. (1958).Research Report Writing. New York : Barner and Noble.

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16.7 Terminal Questions

Q. 1   Define research ethics in educational research.
Q. 2   What is plagiarism in research?
Q. 3   Discuss the issue of privacy in research ethics.
Q. 4   Discuss the importance of ethics in research.
UNIT - 17
RESEARCH SKILLS

STRUCTURE
17.0   Introduction
17.1   Learning Objectives
17.2   Skills needed to Design and Conduct Educational Research
           Self-Check Exerxise-1
17.3   Summary
17.4   Glossary
17.4   Answers to Self Check Exercises
17.5   Suggested Readings
17.6   Terminal Questions
17.0   INTRODUCTION
Research is more of a process than the product. In this process of education, a kind of persona is developed in a researcher. This persona reflects certain qualities which are required to be a good researcher. Without these qualities, research might have flaws which will be reflected in the research work. Although there are no universal or specific traits of a researcher, but a researcher needs to be regular, continuous, focussed and research oriented.
17.1   Learning Objectives
 After reading this lesson, the student will be able to
- know about the research skills needed to perform a good research.
- Understand the importance of research skills while conducting educational research.
- Apply the research skills while designing and conducting educational research.

17.2 SKILLS NEEDED TO DESIGN AND CONDUCT EDUCATIONAL RESEARCH
GATHERING SKILLS
These skills require the researcher to get the relevant information. Research is a lengthy process and has a wide scope. However, what we need in research is convergent thinking process rather divergent. Therefore, it becomes important to gather relevant and appropriate information and data. To improve gathering skills, we need to understand the variables, their relationships with each other, delimitations and resources available to conduct the research. By making sure the earlier mentioned things, a researcher can wisely obtain the information and data related to the study.

To gather relevant information, one can refer to library, dictionary, internet etc. In the absence of these skills, the research will be disoriented and one cannot filter it down stage-wise in order to get the appropriate result.
CONCEPT MAPPING
When a researcher dives into the research, various questions arise in his/her mind. Many a times, it happens that the questions and ideas are interrelated. Therefore, it becomes important to do concept mapping in order to arrange the ideas and relate with the relevant concept. Concept mapping is a great way to understand the correlations, effects and linkages between the variables under concern.

Steps of doing concept mapping:
1. Choose the topic under concern .
2. Delimit the topic and went through the literature review and brainstorming.
3. Write the important information, variables and make linkages.
4. Try to find the central idea and relate the ideas, information and data to it.

The various techniques of doing concept mapping include chart representations, flow charts, diagrams etc.

CONVERGENT THINKING

In research, a researcher is focussed on finding the solution of a problem. We are very well aware that finding a solution requires convergent thinking skills along with little bit of divergent thinking in certain situations. Convergent thinking demands focus, as we need to narrow down the research area to delimit the study and get the relevant data in the allocated budget to get the result which we can generalise to the population. Convergent thinking is unidirectional and helps a researcher to focus and not to deviate in other areas. Convergent thinking is a process where a researcher trims down the options to find the solution to the problem.

Various techniques under convergent thinking are logical reasoning, deduction and focusing on the criteria to arrive at the solution.

UNDERSTANDING THE CONTEXT

It is very important to understand the context of the research as our research is focussed on arriving at a solution. Research is a step-wise process and we need to understand the context in order to work contextually at every stage. For instance, during tool selection, it is important that we know what the study demands, what are the characteristics of population, what is the nature of study and many other considerations.

If we don't understand the context of research, there could be many flaws in the research from making Learning Objectives & hypothesis to data collection & interpretation. For instance, to understand the relevance of teacher education curriculum in present scenario, we can go for effectiveness of curriculum either by document analysis or descriptive survey method. In document analysis, one can arrive at the result by comparing the existing curriculum with the best curriculums or by taking reference from important documents. In descriptive survey method, we can know the perceptions of various stakeholders to know the relevance. Thus, it is very important to understand the context of our research and related concepts & variables.

WRITING SKILLS

Research is all about the academic writing where, it is important that researcher writes in the technical language of the concerned subject. For instance, in education there is a vocabulary which should be used while doing academic writing related to the subject. Words like pedagogy, individual difference, curriculum, assessment and others are part of the education vocabulary.

Along with the subject specific vocabulary, the format should also be kept in mind while writing. The formats will be discussed in the next chapter.

REFERENCE SKILLS

In research, we refer to lot of articles, papers, books, journals and others. Now to ethically use the reference material, we need to give credit to the respective author/authors and publications, and abide by the rules. This could be done by giving due citations and reference in the study. It is very obvious that reading gives us ideas and we cannot rely merely on brainstorming. Therefore, it should be our moral duty as well as our ethical duty to give due credit to the work which we have referred/read.

There are many formats of referencing like APA (American Psychological Association), MLA (Modern Languages Association), the Harvard system and the MHRA (Modern Humanities Research Association). The style and format differs as per the referencing style adopted.

17.3 SUMMARY

Research skills are very crucial for a better and efficient research work. It includes a range of skills and abilities like data collection, relevant information gathering. Critical thinking, problem solving, analysis, writing and referencing. There should be a proper culmination of all the required skills in order to produce a good research work. Researchers should always strive towards attaining these research skills.

17.4 GLOSSARY

Convergent: It is the tendency to move towards a point.

Skills: It is the ability of using theory in practical sense effectively.

Self Check Exercise - 1

Q 1. Convergent thinking is the one where focus is on _____.

17.5 ANSWERS TO Self Check Exercise

Self Check Exercise - 1

Answer1: Finding the solution of problem.

17.6 SUGGESTED READINGS

Bulmer, M. (1982) Social Research Ethics, London: MacMillan.

Cardasco, F. and Gatner, E. (1958).Research Report Writing. New York : Barner and Noble.

Homan, R. (1991) The Ethics of Social Research, London: Longman.

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Cohen, Louis, Manion, Lawrence & Morrison, Keith (2011). Research Methods in Education. Replika Press Pvt. Ltd.

17.7 Terminal Questions

Q.1   What is concept mapping?

Q.2   What is the importance of understanding the context in research?

Q.3   How can a researcher use the referenced material in the research?

UNIT - 18
RESEARCH PROPOSAL

STRUCTURE

18.0   Learning Objectives

After reading this UNIT, the student will be able to

- − Write a research proposal.
- − Decide the style, format and mechanisms of writing a research report.
- − Explain how to write a research report.

18.1   INTRODUCTION

The preparation of a research proposal is a prerequisite for conducting a formal research study. Regardless of whether one is conducting descriptive, historical, or experimental research, the proposal is fundamental, for few people are so sophisticated in conducting research that they can bypass this step in the research process. The research proposal, or agendum, is a systematic plan, which brings together in organized form the preliminary planning that will be needed to accomplish the purpose of the projected study. In addition to presenting a descriptive account of the procedures and materials that are needed in the study, the proposal also serves two other important functions: It provides a blueprint by which the study can be directed; and it provides the means by which the study can later be evaluated.

Although much time and effort are required in preparing the proposal, an important advantage is gained from this task, for the initial plan is often improved through the constructive criticism, comments, and suggestions of other researchers who review the proposal. These critics may be directors of institutional research, the student's major advisor or advisory committee, research and statistical specialists, or other experienced researchers. Since the agendum usually goes through a developmental phase in which deficiencies are corrected, an acceptable proposal is usually the result of several modifications. In most cases these modifications are the result of suggestions that the critics have given to the researcher after having read an earlier version of the proposal.

Essentially, research proposals can be categorized into three major groups. This division is based primarily on the type of study to be done and the purpose for doing it. The most common proposal is the type that is written by the graduate student for perusal by his adviser or research committee. This type of agendum is usually done in preparation for the master's thesis or doctoral dissertation. The writing of the proposal is considered an important first step in conducting research; therefore, it is a general requirement of most graduate schools for beginning researchers.

The second type of agendum is one that a researcher submits to a private or governmental agency. College faculty members and private researchers write most of the proposals in this category. Whether financial support is given depends upon the judgment of the reviewers with regard to the merit of the projected study as presented by the proposal.

Finally, in the third category is the agendum that is written by a school or college faculty member who seeks institutional aid or a faculty research grant. Since more money is now available for research than in the past, more administrators are encouraging their faculties to investigate areas of interest and concern in the field of education. This emphasis has been especially prevalent at the higher education level but is becoming more common at other levels. Teachers in many school districts have been asked to write an agenda and to forward them to the superintendent or to the school research committee for approval in conducting applied research within their own classrooms. As expected, proposals of this type are usually less detailed than the proposals in the other two categories.

18.2   PREPARING THE RESEARCH PROPOSAL

Regardless of the purpose, the research proposal must adhere to certain specifications that are basic to good research. Therefore, even though the format may differ, the essential elements of good research should appear in each proposal.

To help the researcher write the agendum, most governmental and private agencies and institutions of higher learning provide a list of requirements that state specifically the procedures to be filled. An example of such a set of requirements follows.

Procedures in Preparing Research Proposals

The research proposal should contain the following elements and should conform to the following specification:

THE TITLE.

Enough information should be given in the title to identify the study; however, caution must be taken to see that the title is not tool long or too involved.

STATEMENT OF THE PROBLEM.

This section should be primarily an expansion of the title and should be a simple declarative sentence there should be included a brief description of the major subdivision or aspects of the problem stated in general terms.

HYPOTHESES.

Hypotheses are projections of the possible outcomes of the research and are not biased prestatements of conclusions. They present a framework for the analysis of the problem in relation to the plan of attack and indicate how the projected research must lead to one or another set of conclusions.

BACKGROUND AND SIGNIFICANCE OF THE STUDY.

The theoretical and empirical framework from which the problem arises must be briefly described. A short statement of the value of the study and possible applications of the results is necessary. Also, the citation of a limited number of authorities to support the researcher's proposal may help in establishing the significance of the study.

DEFINITION OF TERMS.
Only technical terms or words and phrases having special meanings should be defined.
 LIMITATIONS OF THE STUDY.
The boundaries of the study should be clearly stated in terms of the areas to which the conclusions will be confined. Reasons should be given for all limitations.
BASIC ASSUMPTIONS. Certain defensible assumptions may be necessary to the identification and clarification of a problem. In some cases separate treatment is desirable; in other instances the assumptions may be treated in connection with other topics. A defense should be offered for any assumption.
PROCEDURES FOR COLLECTING DATA.
A complete, precise description should be given for instruments, materials, or devices used in the collection of data. Reasons should be provided for the selection made. There should be a detailed, step-by-step description of the ways in which data are to be collected. This description should include detailed information on the precise data to be collected, the population or sources to be used, sampling procedures, if any, and any other information necessary to further clarify the procedure.
PROCEDURES FOR TREATING DATA.
It is necessary to describe precisely and specifically the way in which data are to be organized. The steps and techniques used to analyze and interpret the data should be presented in detail and should be defended. In addition to the suggested specifications found above, other factors need to be considered in writing the proposal. Some institutions or agencies specify a maximum number of pages that the final draft of the proposal may contain and caution the researcher not to exceed that amount. Usually, the text of the proposal is expected to contain between 12 and 20 pages, but this may vary widely.
Personal information about the researcher is requested by most institutions, especially for agenda in the first and second categories mentioned previously. This information usually includes the researcher's educational background, school experience, and expertise, if any. Most of the proposals written by graduate students are submitted for degree requirements; therefore, besides the other information, the student could include courses completed, grades received, and the names of his advisory committee members.
Let us now consider the previously listed elements of the research proposal and how they should be presented in the text of the proposal. Although the following discussion will pertain primarily to those proposals that are written by graduate students, the suggestions and examples have considerable application to the other types as well.
The Title
Care should be taken in selecting the title for the proposal, because it is usually the same title that will be used later for the research study. In selecting a title, the researcher should consider several things. First, the title should be specific to the area of study, but should not be too lengthy or too involved. It must be remembered that the proposal study cannot completely be presented in the title.
Consider the following as an example of a title that is too lengthy:
AN APPRAISAL OF THE ELEMENTARY TEACHER EDUCATION PROGRAM AT WESTERN STATE UNIVERSITY BY PRESENT AND FORMER STUDENTS WHO ARE AT THREE LEVELS ACCORDING TO THEIR SCORES ON THE WESTERN STATE UNIVERSITY EXAMINATION, ROCHEACH'S DOGMATISM SCALE, GRADE-POINT AVERAGES, AND STUDENT TEACHING GRADES.

Whereas some of the information in the title is necessary to identify the study, certainly not all of it is needed. It would seem that the title AN APPRAISAL OF THE ELEMENTARY TEACHER EDUCATION PROGRAM AT WESTERN STATE UNIVERSITY would give sufficient information about what kind of study it is.

Secondly, the title should indicate the topic of the study, but should not be so broad as to be nebulous. For example, the title AN APPRAISAL OF A COLLEGE PROGRAM is too general. One does not know by the title what kind of college is being appraised. It could be a college within a university, a teacher's college, or a liberal arts college. To improve the title the researcher would need to state which college of what type of college is involved in the study.

Thirdly, the language in the title should be professional in nature but not pedantic. Although it is recognized that technical terms and professional jargon are sometimes necessary in a title, the researcher should not go out of his way to impress others with his professional vocabulary. The title A CONCEPTUALIZATION OF A THEORETICAL EXEMPLAR OF ANALYSIS OF DEVIANT DIDACTIC DISCOURSE is an excellent example of the overuse of pompous words. A more fitting title would be: A MODEL FOR ANALYZING DIFFERENT LEVELS OF CLASSROOM TALK.

Although these examples are a bit exaggerated, they do show the need for a clear, succinct title that gives sufficient information. The following titles have been judged to meet the criteria stated earlier:

TELEVISION VIEWING HABITS OF TEXAS JUNIOR HIGH SCHOOL STUDENTS

A STUDY OF ANXIETY OF UNDERACHIEVING FIRST-GRADE STUDENTS

ATTITUDES OF HIGH SCHOOL TEACHERS TOWARD RACIAL INTEGRATION IN THE SECONDARY SCHOOLS OF ALABAMA

A COMPARISON BETWEEN TWO METHODS OF TEACHING NINTH-GRADE COMPOSITION

AN ANALYSIS OF PROBLEMS OF HIGH SCHOOL SENIORS AS INDICATED BY THE MOONEY PROBLEM CHECK LIST

A COMPARISON OF VOCABULARY LEVELS IN FIVE ELEMENTARY READING TEXTBOOK SERIES

THE PREDICTIVE VALUE OF ENTRANCE TESTS AT LOWHEIGH UNIVERSITY

A FOLLOW-UP STUDY OF SCHOOL DROPOUTS IN THE BOISE, IDAHO SCHOOL DISTRICT

Statement of the Problem
The same criteria for selecting the title should be kept in mind by the researcher when he writes the statement of the problem--clear, simple, and concise statements are preferable. Whereas the title is seldom stated in the form of a question, the statement of the problem sometimes appears as a question. The question is used to bring the problem into greater focus, and in some cases, both the declarative sentence and the question are used. This is generally done when there are subproblems within the larger, major problem. An example of this is:

The central problem of this study is to determine how present and former students of the Elementary Teacher Education Program at Western State University appraised professional aspects of the total program they were receiving or have received in their teacher education preparation.

The fundamental task that is basic to this major purpose is that of selecting a method that will reveal most accurately the present and former students' appraisals of the elementary teacher education program. Subproblems are indicated by the following questions:

1. What are the factors that differentiate the courses named by the students as being the most and least valuable?

2. What are the major strengths of the elementary teacher education program as indicated by the students at three levels of experience?
3. What are the major weaknesses of the elementary teacher education program as indicated by the students at three levels of experience?

Hypotheses

Hypotheses are formulated to explain observed facts, conditions, or behavior and to serve as a guide in the research process. These statements may or may not be accurate; therefore, each hypothesis is individually tested to determine whether it is tenable.

Although one may state hypotheses about a given situation, this does not mean that these statements are acceptable for research purposes, since there may be several conditions that are considered necessary if hypotheses are to be used correctly by researchers. Some suggested guides for developing hypotheses are:

1. Hypotheses should be developed specifically in terms of the present investigation rather than in terms of broad, unrestricted generalities.
2. Hypotheses should be made only when they can be tested.
3. Hypotheses should, whenever possible, show a stated relationship among variables in the study.
4. Hypotheses should be stated in clear, concise, and understandable language.

For example, let us evaluate the following hypothesis using the above criteria: Good listeners are good readers. This statement is a hypothesis according to the definition; but it does not adequately meet the four stated conditions. Even though it vaguely indicates a relationship among the variables, this statement does not fulfill the other requirements. As presently stated, it would not be acceptable as a research hypothesis. The following version of the previous hypothesis meets the four conditions:

Students in the upper quarter of their class, according to their scores on the *S.T.E.P Listening Test*, will achieve significantly higher scores in reading achievement as measured by the *Iowa Silent Reading Comprehension Test* than students receiving scores in the lower quarter on the listening test.

For research purposes, this revised statement is an improvement over the original hypothesis because it is stated in terms that are restricted, testable, related, and exact.

Research hypotheses may also be stated in the "null" form. A *null hypothesis* is a nondirectional hypothesis that states that no difference or no relationship exists. An example of a null hypothesis follows:

There will be no significant difference between group means for students on the *Iowa Silent Reading Comprehension Test* who rank in the upper quarter of their class on the *S.T.E.P. Listening Test* and those who rank in the lowest quarter.

Should the results of such a study indicate that the students in the upper quarter of their class, according to their listening scores, in fact scored significantly higher on the reading test, the null hypothesis would be rejected. However, if no significant difference in the reading scores existed, the null hypothesis would be retained.

There is some disagreement among researchers concerning the value of this type of Hypothesis. Since the null form does not attempt to predict the outcomes or results of a study, those who criticize this type of Hypothesis stress that it is "too timid." They argue that a researcher should indicate the direction of the outcomes of his study whenever possible. They further argue that predicting the results of a study is less awkward in phrasing a relationship, or lack of one, than in using the "no difference" phrase that is common in the null form.

On the other hand, the proponents who urge the use of the null form in writing hypotheses emphasize the fact that the researcher must remain unbiased throughout his research efforts. The null hypothesis is defined on this basis because the researcher neither predicts nor indicates any preconceived attitude that might influence his behavior during the conduct of the study.

Since there is some disagreement among researchers concerning the value and use of the null hypothesis, a researcher writing his proposal may wish to seek guidelines from the appropriate institution or agency. In the case of students, they may consult their major advisor or research committee for this information.

Background and Significance of the Study

In this section of the proposal the researcher will demonstrate that he has an understanding of his study in a theoretical framework. Based on this foundation the researcher justifies the need for, and the value of, his study. One way to accomplish this is to document the need for the study by presenting the supporting statements of other researchers.

A second way of showing the need for a study is to reveal the lack of information about a research topic, but in doing this, the researcher has the obligation of defending the value and worth of such a study. This is particularly true in cases in which there is a paucity of information available to the researcher.

A third means of establishing a need for a research study is to show the time lapse between the previous research study and the present one. A replication of earlier studies is sometimes justified when new knowledge, techniques, or conditions indicate a need for updating the study.

A fourth and final way is to reveal that there are gaps in the knowledge supplied by other research studies and to show how the present study will augment the findings of the other studies.

Definition of Terms

All terms that might be ambiguous or esoteric should be clarified in this section of the proposal. A clear understanding of the use of terms in the research study is important in communicating the correct idea. For example, the term elementary sequence has no exact, universal meaning. Therefore, it should be defined according to the use it will have for a particular study. For example, this term may be defined in the following way:

Elementary Sequence -- This term refers to a sequence of eight courses in elementary education that are required of all elementary education majors at Western State University.

Another example is that of the term *evaluation*. It was defined in one research study to mean "the total efforts of all of the individuals involved to appraise a teacher education program." However, during the course of the study the researcher also used the term *student evaluation*, making it necessary to define how these two terms -- evaluation and student evaluation -- differed.

This section of the research proposal also would call attention to the use of a shortened or abbreviated form of a title or name. Instead of referring to the title *Elementary Teacher Education Program at Western State University* each time, the following statement could be made:

The Program -- This term refers to the Standard Four-Year Elementary Teacher Education Program at Western State University.

When in doubt about the meaning of technical terms in the fields of education, psychology, and sociology, the researcher may wish to consult the following sources: *The Dictionary of Education*, edited by Carter V. Good; *The Comprehensive Dictionary of Psychological and Psychoanalytical Terms*, edited by Horace B. English and Eva C. English; and *The Dictionary of Sociology*, edited by H.P. Fairchild. Each of these dictionaries is a valuable and necessary source for definitions of technical terms.

Limitations of the Study

Every research study is likely to have certain limitations, and it is the researcher's obligation to report those factors that impose limitations upon his study. Two major categories into which the limiting factors can be classified are *conceptual (or definitional) and methodological*.

The conceptual or definitional limitations are present in any study in which "global terms" are used but are not carefully defined. Such terms as ":achievement," "learning," "motivation," "personality," and "intelligence" are examples of global terminology. Since each of these terms can be used in many different ways, the researcher must define them in the specific way that he plans to use them. Some researchers find it necessary to develop their own terminology. This alternative is permissible provided that the terms or concepts are specifically defined.

The methodological limitations of a study are those limiting factors that affect the procedures of, and interpretations by, the researcher in conducting his research. These limiting factors may be evident in the sampling procedures, the techniques of data collection and analysis, the development of measuring instruments and their use in the study, and so forth.

A frequent methodological error committed by beginning researchers is the failure to acknowledge in the statement of limitations, that the findings of their research are limited by factors and conditions affecting their study. For example, a researcher who is doing a study based on data collected by means of a questionnaire should acknowledge that the validity of his findings will depend upon such factors as an adequate return of questionnaires by the respondents, the mood of the respondents when they complete the questionnaires, and the quality of the questionnaire items. Regardless of the type or number of limitations that are involved, the researcher must list all important limitations of the study to demonstrate that they exist.

Basic Assumptions

An assumption is a representative statement of an idea that is accepted as true. In a research situation, statements of this type are referred to as basic assumptions because they are the foundation upon which the research study is based. They are written to reveal what the researcher, and other, theorize to be true in the study to be conducted; moreover, they are also written to indicate those factors affecting the study that are necessarily unalterable.

When writing basic assumptions one must give serious consideration to the defensibility of each statement. This defense should be based upon logic, empirical evidence (objective data), or authoritative sources. Unless at least one of these criteria is evident, the basic assumption cannot be defended and, therefore, should not be accepted.

For example, in the study *An Appraisal of the Elementary Teacher Education at Western State University*, mentioned earlier in this chapter, the basic assumptions and the reasons for selecting them were:

1. Student appraisals should supplement administration and faculty evaluations of the Program. *This assumption was based on the logic that one cannot conduct a complete evaluation without including all who are involved; therefore, based on this reasoning student responses are needed to give a complete picture of attitudes toward the Program.*
2. Present and former students can and do make appraisals of the type of education they are receiving or have received.
3. *This assumption was based on empirical evidence by both present and former students who were more than willing to express their views about the education they were receiving or had received in college. This fact was documented in a review of the literature of other appraisal studies as well as in a pilot research study.*

4. An instrument can be devised that will permit the subjects to report their appraisals accurately.

This assumption was based on the statements of authorities in the field of tests and measurements and upon the observations of researchers who have refined appraisal instruments in pilot studies through the suggestions of participants.

Certainly, the value of any study would be debatable if its basic assumptions were questionable; therefore, researchers in writing their proposals should select their basic assumptions with care and be particularly aware of certain common errors. The first of these is the failure to state all of the basic assumptions that are relevant to the study. This occurs when an assumption is implicitly accepted without being explicitly stated. This situation is sometimes found in questionnaire studies, in which necessary assumptions have been taken for granted without being designed as basic assumptions of the study. For example, the belief that participants' responses to; questionnaire items are based on their "real" or "true" feelings is basic to any questionnaire study. Perhaps this belief cannot be adequately defended, but the researcher is obligated to state this assumption.

The second error concerns irrelevant assumptions. These are assumptions that are neither applicable nor necessary to the study. An example of this would be a supposition about the age of participants and the effect it has on their behavior, although age is unimportant to the conduct of the study.

The third error is that of using unsubstantiated assumptions. This involves making an assumption that cannot be defended by any of the criteria stated earlier in this section. The neophyte researcher who develops and used his own test in his research sometimes commits this error when he assumes too mush about the instrument. Without having determined its validity and reliability, the researcher cannot assume that it is a valid and reliable instrument. To avoid making an unsubstantiated assumption the researcher should go through the process of validating his instrument or use another instrument that has been already validated (a valid instrument is one that measures what it is purported to measure). Having done this, the researcher can make a basic assumption about the instrument that he will use in his study.

Procedures for Collecting Data

Any discussion of the procedures for collecting data must give attention to three considerations. First, the researcher must determine the *kinds of information needed* to answer the research questions, then he must ask *what kind of data will supply* the requisite information. Secondly, the researcher must know where the data can be found. Finally, he needs to know the means by which he will gather the information for his study.

The use of standardized instruments, such as intelligence tests, achievement tests, inventories, rating scales, and so on, is a common means used for collecting data. But before one decides to use any standardized instrument, he should consult the *Mental Measurements Yearbooks* and other similar sources to see if the instrument is appropriate for the task of collecting the desired data.

In a case in which a researcher has developed a new instrument, he should briefly describe the instrument and its purpose in the research proposal. In addition, he should describe the procedure used to validate the instrument.

Other means of collecting data are through observation of behavior and through the synthesis of literature previously written about the topic. A detailed discussion on tools and techniques of data collection may be found in Chapter 9.

Procedures for Treating Data

In this final section of the proposal the researcher describes how he plans to organize the data of the study so that they can be analyzed. Following this procedure, the researcher discusses the techniques for determining the meaning of the "processed" data.

If a statistical treatment of the data is to be used, it should be described also in this section of the proposal. Moreover, the researcher should discus the appropriateness of a given statistical technique for this study. Of course, after the data have been collected it may be necessary to revise or extend the statistical treatment because of unforseen circumstances.

A thorough discussion of the procedure for treating the data is important, because in this section of the proposal the researcher reveals his understanding of methods of research. It is in this section that the sophisticated researcher also shows his ability to organize and utilize data in the most efficient manner.

Self Check Exercise -1

Q 1. During research analysis, data should be_____.

18.3 SUMMARY

In this chapter, we learnt about research proposal which acts like a blueprint during the whole research. The research proposal needs to be definite and as clear as possible. A good research proposal should not have the element of ambiguity. Therefore, the research proposal is crucial and guides at every stage of research.

18.4 GLOSSARY

Analysis: It is the process of detailed examination of certain phenomenon, process or event.

Data: It is the information about some attribute of the subject based upon which research is carried out.

Hypothesis: A tentative statement that is testable.

18.5 ANSWERS TO SELF CHECK EXERCISE

Self Check Exercise -1

Answer1: Organised.

18.6 SUGGESTED READINGS

Bulmer, M. (1982) Social Research Ethics, London: MacMillan.

Cardasco, F. and Gatner, E. (1958).Research Report Writing. New York : Barner and Noble.

Homan, R. (1991) The Ethics of Social Research, London: Longman.

Lee-Trewick, G. and Linkogle, S. (eds.) (2000) Danger in the Field: Risk and Ethics in Social Research, London: Routledge.

Turabian, K. Manual for Writers of Term Papers, Theses, and Dissertations. (7th ed.) Chicago: University of Chicago Press. 2007.

Jeffrey, A. Gliner & George A. Morgan (2000). Research Methods In Applied Setting: An Integrated Approach to Design and Analysis. Lawrence Erlbaum Associates: United States.

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Konrad, H. Jarausch & Kenneth, A. Hardy (1991). Quantitative Methods for Historian: A Guide to Research Data and Statistics. University of North Carolina Press.

Creswell, John W. (2014). Educational Research: Planning Conducting and Evaluating Quantitative & Qualitative Research. PHI Learning Pvt. Ltd.: Delhi.

Cohen, Louis, Manion, Lawrence & Morrison, Keith (2011). Research Methods in Education. Replika Press Pvt. Ltd.

18.7 TERMINAL QUESTIONS

Q.1   State the steps involved in writing a research proposal.

Q.2   Explain the procedure for collecting data.

Q.3   Discuss the importance of hypothesis in research.

Q.4   What is the statement of a problem?

UNIT- 19
RESEARCH REPORT
19.0   Objectives
19.1   Introduction
19.2   Research Report
         Self-Check Exercise-1
19.3   Summary
19.4   Glossary
19.4   Answers to Self Check Exercise
19.5   Suggested Readings
19.6   Terminal Questions
19.0   OBJECTIVES
After reading this unit, the student will be able to
   – Decide the style, format and mechanisms of writing a research report.
   – Explain how to write a research report.
19.1   INTRODUCTION
In research, report writing is vital as it is the source through which we showcase our work to others. Therefore, to understand and build the writing skills are important. In this chapter we shall know about different components of research report.
19.2   RESEARCH REPORT
Educational research is shared and communicated to others for dissemination of knowledge. After completion of research activities, the researcher has to report the entire activities that are involved in research process systematically in writing. For clear and easy understanding of readers, writing a good research report requires knowledge of the types of research reporting, rules for writing and typing, format and style of research reporting and the body of the report. However, scholarship, precision of thought and originality of a researcher cannot be undermined in producing a good research report.
19.2.1 TYPES OF RESEARCH REPORT
Research reports mainly take the form of a thesis, dissertation, journal article and a paper to be prescribed at a professional meeting. Research reports vary in format and style. For example, there are difference found in a research report prepared as a thesis or dissertation and a research report prepared as a manuscript for publication.
The dissertation and thesis are more elaborate and comprehensive. While research papers prepared for journal articles and professional meeting are more precise and concise.
19.2.2   FORMAT
Format refers to the general pattern of organisation and arrangement of the report. It is an outline that includes sections and subsections or chapters and subchapters or headings and subheadings

followed to write research report. All research reports follow a format that is parallel to the steps involved in conducting a study. The format of a research report is generally well spelled out in contents. Different universities, institutions and organizations publishing professional journals follow style manual prepared on their own. Some institutions follow by style manuals prepared by other professional bodies like the American Psychological Associations, the University of Chicago and the Harvard Law Review Association. The Publication Manual of the American Psychological Association (APA), the Chicago Manual of Style, and A Uniform System of Citation (USC) published by Harvard Review Association are some of the worth mentioning style manuals that are followed by researchers to follow format and style while writing research reports.

The APA format is widely followed because it eliminates formal footnotes. It provides detailed information about research format for all types of research reports on various behavioural and social science disciplines. The CMC presents guidelines for use of quotations, abbreviations, names and terms and distinctive treatment of words, numbers, tables, mathematics in type and writing footnotes. Some historians and ethnographers prefer to use the CMC and USC.

The common format used to write research report of quantitative studies for a degree requirement is as follows.

Preliminary pages
1. Title Page
a) Title
b) Degree requirement

c) University or institution's name

d) Author's name

e) Supervisor's name
f) University Department
g) Year
2. Acknowledgements
3. Supervisor's Certificate
 4. Table of contents
5. List of Tables
6. List of Figures
Main Body the Report
1. Chapter – I : Introduction
a. Theoretical Framework
b. Rationale of the study
c. Statement of the problem
d. Definitions of terms
e. Learning Objectives
f. Hypothesis
g. Scope and Delimitations of the study
h. Significance of the study
 2. Chapter II : Review of Related Literature
3. Chapter III : Methodology and Procedures
a. Design and Research method
b. Population and sample
 c. Tools and techniques of data collection

d. Techniques of data analysis
4. Data Analyses
 5. Results and Discussions
6. Conclusions and Recommendations
7. Bibliography
8. Appendices
The common format followed for qualitative research including historical and analytical research is different from the format followed in quantitative research. The common format used usually to write research report of qualitative studies for degree requirements is as follows.
1. Preliminary pages (same as in quantitative research)
2. Introduction
a) General problem statement
b) Preliminary Research Review
c) Foreshadowed Problems
d) Significance of the study
e) Delimitations of the study
3. Design and Methodology
a) Site selection
b) Researcher's Role
c) Purposeful / Theoretical Sampling
d) Data collection strategies
4. Qualitative Data analysis and Presentation
5. Presentation of Findings : An Analytical interpretation
6. Bibliography
7. Appendices
The common format followed for writing a research report as an article or a paper for a journal and seminar is as follows :

1. Title and author's name and address

2. Abstract
3. Introduction
4. Method
a) Sample
b) Tools
 c) Procedure
5. Results
6. Discussions
7. References
19.2.3 STYLE
Style refers to the rules of spelling, capitalization, punctuations and typing followed in preparing the report. A researcher has to follow some general rules for writing and typing a research report. The rules that are applicable both for quantitative and qualitative research report are as follows :
1. The research report should be presented in a creative, clear, concise and comprehensive style. Literary style of writing is to be replaced by scientific and scholarly style reflecting precise thinking. Descriptions should be free from bias, ambiguity and vagueness. Ideas need to be presented logically and sequentially so that the reader finds no difficulty in reading.

2. The research report should be written in a clear, simple, dignified and straight forward style, sentences should be grammatically correct. Colloquial expressions, such as 'write up' for report and 'put in' for insert should be avoided. Even great ideas are sometimes best explained in simple, short and coherent sentences. Slang, flippant phrases and folksy style should be avoided.

3. Research report is a scientific document but not a novel or treatise. It should not contain any subjective and emotional statements. Instead, it should contain factual and objective statements.

4. Personal pronouns such as I and me, and active voice should be avoided as far as possible. For example, instead of writing I randomly selected 30 subjects, it is advisable to write thirty subjects were selected randomly by the investigator.

5. Sexist language should be replaced by non-sexist language while writing research report. Male or female nouns and pronouns (he and she) should be avoided by using plurals. For example, write children and their parents have been interviewed rather than child and his parents were interviewed.

6. Instead of using titles and first names of the cited authors, last name is needed. For example, instead of writing Professor John Dewey, write Dewey.

7. Constructed forms of modal auxiliaries and abbreviations should be avoided. For example, shouldn't, can't, couldn't should not be used. However, abbreviations can be used to avoid repetition if the same has been spelled out with the abbreviation in parentheses. For example, researcher can write NCERT if he/she has used NCERT in parenthesis in his/her earlier sentences like National, Council of Educational Research and Training (NCERT).There are few exceptions to this rule for wellknown abbreviations such as IQ.

8. Use of tense plays an important role in writing a research report. Past tense or present perfect tense is used for review of related literature and description of methodology, procedure results and findings the study, Present tense is appropriate for discussing results and presenting research conclusions and interpretations. Future tense, except in research proposals, is rarely used.

9. Economy of expression is important for writing a research report. Long sentences and long paragraphs should be avoided. Short, simple words are better than long words. It is important that thought units and concepts are ordered coherently to provide a reasonable progression from paragraph to paragraph smoothly.

10. Fractions and numbers which are less than ten should be expressed in words For example, six schools were selected or fifty percent of students were selected.

11. Neither standard statistical formula not computations are given in the research report.

12. Research report should not be written hurriedly. It should be revised many times before publication. Even typed manuscripts require to be thoroughly proofread before final typing.

13. Typing is very important while preparing research report. Use of computer and word processing programme has made the work easy. However, following rules of typography require to be followed.

i) A good quality of hand paper 8.5 , by 11 in size and 13 to 16 pound in weight should be used.

ii) Only one side of the sheet is used in typing.

iii) The left margin should be 1.5 inches. All other margins i.e. the top, the bottom and the right should be 1 inch.

iv) All material should be double spaced.

v) Times New Roman or A Oldman Book Style with 12 size front can be used for typing words in English and book titles can be italicized.

vi) Direct quotations not over three typewritten lines in length are included in the text and enclosed in quotation marks. Quotations of more than three lines are set off from the text in a double –

spaced paragraph and indented five spaces from the left margin without quotation marks. However, original paragraph indentations are retained. Page numbers are given in parentheses at the end of a direct quotation.

Self Check Exercise - 1

Q. 1   State any two types of research report.

19.3 SUMMARY

A research report is the collection of everything we have done throughout our journey of research. Therefore, it is of the utmost importance to give emphasis to research report and writing. We should be well acquainted with the steps in report writing, procedures of data collection and analysis of the data. A good research report is the one which includes all the necessary elements like introduction, literature review, hypothesis, objectives, contextual factors, tools used, techniques and methods along with others.

19.4 GLOSSARY

Research Report: Recorded data prepared by researcher in a systematic and organised way.

Abstract: A short summary of research.

Style: The way of writing the whole document including font size, indents, referencing etc.

19.5 ANSWERS TO SELF CHECK EXERCISE

Self Check Exercise - 1

Answer1- Thesis, Dissertation.

19.6 SUGGESTED READINGS

Bulmer, M. (1982) Social Research Ethics, London: MacMillan.

Cardasco, F. and Gatner, E. (1958).Research Report Writing. New York : Barner and Noble.

Homan, R. (1991) The Ethics of Social Research, London: Longman.

Lee-Trewick, G. and Linkogle, S. (eds.) (2000) Danger in the Field: Risk and Ethics in Social Research, London: Routledge.

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Jeffrey, A. Gliner & George A. Morgan (2000). Research Methods In Applied Setting: An Integrated Approach to Design and Analysis. Lawrence Erlbaum Associates: United States.

Kerlinger, Fred N. (2014). Foundations of Behavioral Research. Surjeet Publications: New Delhi.

Konrad, H. Jarausch & Kenneth, A. Hardy (1991). Quantitative Methods for Historian: A Guide to Research Data and Statistics. University of North Carolina Press.

Creswell, John W. (2014). Educational Research: Planning Conducting and Evaluating Quantitative & Qualitative Research. PHI Learning Pvt. Ltd.: Delhi.

Cohen, Louis, Manion, Lawrence & Morrison, Keith (2011). Research Methods in Education. Replika Press Pvt. Ltd.

19.6 TERMINAL QUESTIONS

Q.1   Explain the format of research report.

Q.2   What are the key points to remember while writing an abstract?

Q.3   What do you understand by the style of referencing in research?

Q.4   How will you differentiate a dissertation from that of a thesis?

UNIT- 20
ETHICAL RESEARCHER

20.0   OBJECTIVES

After reading this chapter, the student will be able to:
   - Understand the researcher ethics.
   - develop the researcher ethics.
   - Understand the code of ethics.

20.1   INTRODUCTION

As researchers we are unable to conduct our projects successfully if we do not receive the help of other people. If we expect them to give up their valuable time to help us, it follows that we should offer them something in return. Many people are willing to disclose a lot of personal information during our research so we need to make sure that we treat both the participants and the information they provide with honesty and respect. This is called research ethics.

20.2   HOW TO BE AN ETHICAL RESEARCHER
Treating Participants with Respect

As a researcher you must remember that the research process intrudes on people's lives. Some of the people who take part in your research may be vulnerable because of their age, social status or position of powerlessness. If participants are young, you need to make sure a parent or guardian is present. If participants are ill or reaching old age you might need to use a proxy and care should be taken to make sure that you do not affect the relationship between the proxy and the participant.

Some people may find participation a rewarding process, whereas others will not. Your research should not give rise to false hopes or cause unnecessary anxiety. You must try to minimise the disruption to people's lives and if someone has found it an upsetting experience you should find out why and try to ensure that the same situation does not occur again.

As a researcher you will encounter awkward situations, but good preparation and self-awareness will help to reduce these. If they do happen, you should not dwell too long on the negative side – reflect, analyse, learn by your mistakes and move on.

You must do your best to ensure anonymity and confidentiality. However, information given by research participants in confidence does not enjoy legal privilege. This means that the information may be liable to subpoena by a court. If you're dealing with very sensitive information which you know could be called upon by a court of law, you will need to inform your participants that you would be obliged to hand over the information.

Code of Ethics

Once you have been open and honest about what you are doing and people have agreed to take part in the research, it is useful to provide them with a Code of Ethics. The best time to do this is just

before they take part in a focus group or interview, or just before they fill in your questionnaire. The Code of Ethics supplies them with details about what you intend to do with the information they give and it shows that you intend to treat both them and the information with respect and honesty. It covers the following issues:

Anonymity: you need to show that you are taking steps to ensure that what participants have said cannot be traced back to them when the final report is produced. How are you going to categorise and store the information? How are you going to make sure it is not easily accessible to anyone with unscrupulous intentions? Do you intend to change the names of people, towns and organisations? If not, how will you ensure that what someone says cannot be used against them in the future? However, you must be careful not to make promises that you cannot keep.

Confidentiality: you need to show that information supplied to you in confidence will not be disclosed directly to third parties. If the information is supplied in a group setting, issues of confidentiality should be relevant to the whole group who should also agree not to disclose information directly to third parties. You need to think about how you're going to categorise and store the information so that it cannot fall into unscrupulous hands. Again, you need to make sure that you do not make promises which you can't keep.

Right to comment: this will depend on your personal methodological preferences and beliefs. Some researchers believe that willing participants should be consulted throughout the research process and that if someone is unhappy with the emerging results and report, they have the right to comment and discuss alterations. Indeed, this can be seen as part of the research process itself. Other researchers believe that once the information has been supplied, it is up to them what they do with it. If you're not willing to discuss the final report or take on board comments from unhappy participants, you must make this clear from the outset.

The final report: it is useful for participants to know what is going to happen with the results. Who will receive a free copy of the report? Will it be on public display? If the final report is very long you can produce a shorter, more succinct report which can be sent to interested participants. This will keep down your own production and postage costs.

The amount of detail you provide in your Code of Ethics will depend on your research, your participants and your methodological preferences. Some people will not want to see a lengthy list of ethical considerations, whereas others will go through your list with a fine tooth-comb. It is for this reason that you might find it useful to produce two – a short summary and a longer version for those who are interested.

We can sum up it as:

- Our research would not be possible without the help and co-operation of other people. If we expect people to continue helping us, we should treat them with honesty and respect.

- Disruption to a participant's life should be kept to a minimum.

- False hopes or expectations should not be raised.
- Confidential or anonymous data does not enjoy legal privilege.
- Overt research means that it is out in the open – everyone knows who the researcher is and what she is doing.
- Covert research means that it is under-cover work. Nobody knows who the researcher is and what she is doing. This type of work can give research a bad name and has personal safety implications for the researcher and for the people with whom she comes into contact.

- It is an individual's prerogative to refuse to take part in research – nobody should be forced, bullied or cajoled into taking part.
- If someone is thinking about helping with your research, they should be given a leaflet which includes the following information:

– Details about who you are and the organisation for which you work.

– Details about your project, the funding body and what will happen to the results.

– Information about possible benefits to be gained by taking part in the research (false promises should not be made).

- A short Code of Ethics should be given to everyone who takes part in the research. This should include the following issues:

– anonymity

– confidentiality

– right to comment

– the final report

– Data Protection.

- A longer, more detailed Statement of Ethical Practice can be produced for anyone who requests a copy.

Self Check Exercise - 1

Q 1. Code of ethics should include which issues?

20.3 SUMMARY

In every field, there are certain rules and norms which make sure that the work is taking place in the right direction and free from disruptions. To get such qualities, a code of ethics has been developed for the researchers which they should follow and integrate in their work.

20.4 GLOSSARY

Ethics: It refers to way of doing research which is acceptable to all and does not violate rules and norms.

Anonymity: To not reveal the identity.

Confidentiality: To not share the details of the person to unauthorised people.

Code of Ethics: A set of rules and norms to guide ethical practices amongst the researchers.

20.5 Answers to Self Check Exercise

Self Check Exercise - 1

Answer1: Anonymity, confidentiality, right to comment, final report, data protection.

20.6 SUGGESTED READINGS

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20.6   Terminal Questions

Q.1   How can a researcher follow code of ethics in research?

Q.2   How can a researcher maintain confidentiality in research?

Q.3   Why is it important to maintain anonymity in research?

Q.4   What are the serious consequences to be held in case of data leakage?