
TITLE: INTRODUCTION TO EDUCATIONAL RESEARCH

STRUCTURE

- 1.1 Objectives
- 1.2 Introduction
- 1.3 Meaning of Educational Research
- 1.4 Nature
- 1.5 Scope
- 1.6 Let Us Sum Up
- 1.7 Lesson End Exercise
- 1.8 Suggested Further Readings
- 1.9 Answer to Check Your Progress

1.1 OBJECTIVES:

After reading this lesson, you shall be able to:

- To explain the concept of Educational Research
- Formulate one's own meaning of educational research
- Understand the nature of educational research
- To describe the scope of Educational Research

1.2 INTRODUCTION

Research is devoted to find the conditions under which a certain phenomenon occurs and those under which it does not occur. The term "research" consists of two words 'Re' and 'Search'. 'Re' means again and again Search means to find out something new. Thus, research is a process of which a person observes the phenomenon again and again collects the data and he draw some conclusions on the basis of data.

Research is an objective, impartial, empirical and logical analysis and recording of controlled observations that may lead to the development of generalizations, principles or theories, resulting, to some extent in prediction and control of events that may be consequences or causes of specific phenomenon. Research is scientific and as such is not satisfied with isolated facts, but seeks to integrate and systematize its findings. It is concerned with the objective verification of generalizations. Such verification requires logical analyses of problems and devising of appropriate mythological for obtaining evidence.

There is no any universal definition of research. To make idea of research very clear enough, following definitions are included herewith. These are:

John W. Best. "Research may be defined as the systematic and objective analysis and recording of controlled observations that may lead to the development of generalizations, principles or theories, resulting in prediction and possible ultimate control of events."

W.S. Monroe. "Research may be defined as a method of studying problems whose solutions are to be desired partly or wholly from facts. The facts dealt with in research may be of options, historical facts, those contained in records and reports, the results of tests, answers to questionnaires, experimental data of any sort, and so forth"

Kerlinger. "Scientific research is systematic, controlled, empirical and critical investigation of hypothetical propositions about the presumed relations among natural phenomena."

P. M. Cook "Research is an honest, exhaustive, intelligent searching for facts and their meaning or implications with reference to a given problems."

Robert Ross. "Research is essentially an investigation, a recording and an analysis of evidence for the purpose of gaining knowledge."

Young. "Research is a scientific undertaking which, by means of logical and systematic techniques aims to: (1) discover new facts or verify and test old facts, (2) analyses their sequences, interrelationships and casual explanations, (3) develop new scientific tools, concepts and theories which would facilitate reliable and valid study of human behavior"

From the above definitions, we can say that research is an act of systematic, critical and scientific investigation of materials and sources in order to establish facts and reach new conclusions. These investigations are increasing the stream of knowledge. At last, researches means investigations consisting of determination and search something which may satisfy the curiosity of the investigator

1.3 MEANING OF EDUCATIONAL RESEARCH:

Educational research is a field of study that focuses on the investigation of educational phenomena, processes, and practices to improve educational outcomes. It involves systematic inquiry, using various research methods, to gather data and evidence that can inform educational policy, theory, and practice.

Educational research can cover a wide range of topics, including teaching and learning strategies, curriculum design, student motivation, assessment and evaluation, educational technology, and teacher professional development.

Researchers in this field may use qualitative or quantitative research methods, or a combination of both, to gather and analyze data. The ultimate goal of educational research is to improve the quality of education and enhance student learning outcomes by generating new knowledge and evidence-based recommendations for policy and practice.

Definitions:

Educational Research as nothing but cleansing of educational process. Many experts think Educational Research as under:

According to **Mouly**, Educational Research is the systematic application of scientific method for solving educational problem.

According to **Travers**, Educational Research is the activity for developing science of behavior in educational situations. It allows the educator to achieve his goals effectively.

According to **Whitney**, Educational Research aims at finding out solution of educational problems by using scientific philosophical method.

According to **Munroe**, "The final purpose of educational research is to ascertain principles and develop procedures for use in the field of education."

According to **Good** "Educational research is the study and investigation in the field of education."

According to **Mulay** "Any systematic study designed to promote the development of education as a science can be considered educational research."

Crawford's definition of educational research is "Educational research is a systematic and refined technique of thinking, using special tools in order to obtain a mere adequate solution of a problem."

J. W. Best says, "Educational research is that activity which is directed towards development of a science of behavior in educational situations. The ultimate aim of such a science is to provide knowledge that will permit the educator to achieve his goals by the most effective methods."

Thus, Educational Research is to solve educational problem in systematic and scientific manner, it is to understand, explain, predict and control human behaviour.

1.4 NATURE OF EDUCATIONAL RESEARCH:

The following characteristics are related in that, as a whole, they describe the nature of research:

1. Research is empirical;
2. Research is systematic;
3. Research should be valid;
4. Research should be reliable;
5. Research can take on a variety of forms.

McMillan and Schumacher (1989) define research as "a systematic process for collecting and analyzing information (data) for some purpose."

Kerlinger defines scientific research as "systematic, controlled, empirical and critical investigation of natural phenomena guided by theory and hypotheses about the presumed relations among such phenomena."

1. Research is Empirical: Scientific Method:

Empiricism is the concept that all knowledge is derived from a sense experience; this experience results in some information form-data- so that knowledge can be generated upon it. Researchers work upon data; this may involve organizing them, generating hypotheses, testing them and so on.

2. Systematic Process of Research:

1. Identifying a problem: The nature of the problem is to be defined; related knowledge is identified and a framework to conduct the research is established. In addition, necessary assumptions and conditions are also identified.

2. Review information: The researcher reviews how others approached a similar problem; i.e. Literature review.

Scientific Method: research process is considered to consist of a series of sequential steps. **Scientific Inquiry:** search for knowledge through recognized methods of data collection, analysis and interpretation.

To make research systematic, researchers use the approach of scientific inquiry and scientific method.

3. **Data collection:** Collecting data requires a proper organization and control to validate the data to make decisions upon them
4. **Data analysis:** Data analysis must be done in a manner appropriate to the problem.
5. **Drawing conclusions:** Following data analysis, researchers draw conclusions and make generalizations based on the data they had collected.

3. The Validity of Educational Research:

Researches must be based on facts; i.e. capable to be justified. There are two concepts: Internal validity is a prerequisite for external validity because if the results cannot be interpreted accurately with confidence, researchers cannot generalize them.

External Validity: the extent to which research results can be generalized.

1.5 SCOPE OF EDUCATIONAL RESEARCH:

Name of Educational Research changes with the gradual development occurs with respect to knowledge and technology, so Educational Research needs to extend its horizon. Being scientific study of educational process, it involves: individuals (Student, teachers, educational managers, parents.) institutions (Schools, colleges, research - institutes) It discovers facts and relationship in order to make educational process more effective. It relates social sciences like education. It includes process like investigation, planning (design) collecting data, processing of data, their analysis, interpretation and drawing inferences. It covers areas from formal education and non formal education as well.

Here are some of the key areas of inquiry within education research:

- **Curriculum development and evaluation:** Education research in this area focuses on the design, development, and evaluation of educational programs, curricula, and instructional materials. Researchers explore issues such as curriculum alignment with standards, assessment of student learning, and effectiveness of instructional materials.
- **Teacher education and professional development:** Education research in this area examines the preparation, training, and ongoing professional development of teachers. Researchers may explore issues such as the effectiveness of teacher education programs, the impact of professional development on teacher effectiveness, and the use of technology in teacher education.
- **Student learning and achievement:** Education research in this area focuses on understanding how students learn and what factors contribute to their academic success. Researchers may investigate issues such as student motivation, learning styles, and the impact of the classroom environment and instructional practices on

student learning.

- **Educational policies and governance:** Education research in this area examines the policies, regulations, and governance structures that shape education systems. Researchers may explore issues such as funding and resource allocation, accountability and assessment, and the role of stakeholders in decision-making.
- **Education technology and digital learning:** Education research in this area examines the use of technology in education, including online and blended learning, educational software and games, and digital tools for instruction and assessment.
- **Special education and inclusive education:** Education research in this area focuses on understanding the needs of students with disabilities and developing effective strategies to support their learning. Researchers may investigate issues such as inclusive practices, assistive technology, and the impact of special education programs on student outcomes.
- **Assessment and evaluation of educational programs:** Education research in this area examines the effectiveness of educational programs and interventions, using a range of assessment and evaluation methods. Researchers may explore issues such as program design, implementation, and impact on student learning.
- **Educational psychology and motivation:** Education research in this area focuses on the psychological processes involved in teaching and learning, including motivation, cognition, and behavior. Researchers may investigate issues such as student engagement, self-regulation, and the impact of different teaching strategies on student motivation.
- **Educational leadership and management:** Education research in this area examines the role of leaders in shaping educational policy and practice, including issues such as school governance, leadership styles, and the impact of leadership on school culture and student outcomes.
- **Adult education and lifelong learning:** This area focuses on understanding the needs of adult learners. Developing effective strategies to support their ongoing education and professional development.

Overall, the scope of education research is diverse and constantly evolving, reflecting the complex and dynamic nature of education systems and the diverse needs of learners. Education research plays a critical role in informing policy and practice, supporting the ongoing improvement of education systems. It also ensure that all learners have access to high-quality educational opportunities.

1.6 LET US SUM UP

Educational research is a scientific and applied form of studying a problem or a phenomenon usually carried out in natural settings to solve educational problems. Educational research found its utility in all the allied disciplines of education. That's why it is both inter disciplinary as well as multi disciplinary in nature. There are a few steps in educational research, which a researcher is supposed to follow while conducting research. The scope of educational research is very vast. Research is broadly classified based on the purpose-fundamental, applied, and action research. Further, educational research can also be categorized based on the types of data collected. If the nature of data collected from the field is quantifiable or is in numerical form, analysis is done through statistical measures, then research is quantitative. If the data collected is in the form of texts, pictures, images, videos, etc and these are analyzed through a thick description of words, and then the research is called qualitative data. In other words, research is either qualitative or quantitative mainly depending upon the nature of the problem and questions raised by the problem.

1.7 CHECK YOUR PROGRESS 1

Note: a) Write your answers in the space given below.

b) Compare your answers with those given at the end of the Unit.

1. What is meant by research?
2. What do you understand about educational research?
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3. Enlist three key characteristics of educational research.

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4. What is the aim of Educational Research?

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5. What the key areas of inquiry within education research ?

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6. Which approach is adopted in Educational Research?

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1.8 UNIT END EXERCISE :

- (1) What is research? Discuss main characteristics of research.
- (2) What is educational research? Discuss its scope.
- (3) Discuss nature of educational research.?
- (4) Write briefly about interdisciplinary research.

1.9 SUGGESTED FURTHER READINGS

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- Creswell, J. W.(2011). Educational Research: Planning, Conducting and evaluating quantitative and qualitative research (4th Ed.), India: PHI
- IGNOU (n.d). Handbook on Action Research: A document, DPEP-SSA, IGNOU Booklet. New Delhi
- IGNOU. (2017). Introduction to Educational Research (Unit-1) in Perspective of Knowledge (Block-1). MES-016. Educational Research. New Delhi, IGNOU
- Kaul, L.(2009). Methodology of educational research (4th Ed.), New Delhi: Vikas Publishing House.

1.10 Answer to Check Your Progress

1. Self explained
2. Self explained
3. Research is empirical, Research is systematic, Research should be valid
4. To solve educational problem
5. Curriculum development and evaluation, Teacher education and professional development

Student learning and achievement, Educational policies and governance, Education technology and digital learning, Special education and inclusive education, Assessment and evaluation of educational programs, Educational psychology and motivation, Educational leadership and management, Adult education and lifelong learning.

6. Interdisciplinary approach

TITLE: NEED AND PURPOSE

STRUCTURE

- 2.1 Objectives
- 2.2 Introduction
- 2.3 Need for Research in Education
- 2.4 Purpose of educational research
- 2.5 Let Us Sum Up
- 2.6 Lesson End Exercise
- 2.7 Suggested Further Readings
- 2.8 Answer to Check Your Progress

2.1 OBJECTIVES:

After reading this lesson, you shall be able to:

- formulate one's own meaning of educational research,
- describe the need for research in education,
- to state the purpose of educational research.

2.2 INTRODUCTION

Educational research is collecting and systematically analyzing information on education methods to explain them better. It should be viewed as a critical, reflexive, and

professional activity that adopts rigorous methods to gather data, analyze it, and solve educational challenges to help advance knowledge. Educational research typically begins with identifying a problem or an academic issue. From there, it involves the research of all the data, the information must be analyzed to interpret it. This process ends with a report where results are presented in an understandable form of speech, which can be used by both the researcher and the educational community.

The primary purpose of educational research is to expand the existing body of knowledge by providing solutions to different problems in pedagogy while improving teaching and learning practices. Educational researchers also seek answers to questions bothering on learner motivation, development, and classroom management

2.3 NEED FOR RESEARCH IN EDUCATION

Research in education as in other fields is essential for providing useful and dependable knowledge through which the process of education can be made more effective. There are various considerations which emphasize the need for education.

1. Education has strong roots in the field like philosophy, psychology and sociology It is however based on a conceptual frame of theory. It is through an intensive process of scientific enquiry about the philosophical, historical, economic, psychological and sociological impact on various aspects of education that sound theories can be established.

2. There is need for educational research because of the changing conception of education. The international commission on the development of education in its report "Learning to Be" (Unesco,1972,p.143) emphasizes:

Education from now on can no longer be defined in relation to a fixed content which has to be assimilated, but must be conceived of as a process in the human being, who thereby learn to express himself, to communicate and to question the world, through his various experiences, and increasingly - all the time - to fulfill himself. It has strong roots, not only in economics and sociology, but also in findings from psychological research which indicate that man is an unfinished being and can only fulfill himself through constant learning. If this is so, then education takes place at all ages of life, in all situations and circumstances of existence. It returns to its true nature, which is to be total and lifelong, and transcends the limits of institutions, programmes and methods imposed on it down the centuries.

In the context of above nature of education, the limits of educational research have to be extended from the formal and conventional modes of education to the non-formal and innovative systems based on ecological and cybernetic models.

3. During the last two decades. Great changes have taken place as a result of the rapid scientific and technological developments. Education has to play an imp role so that we can accept the change in a smooth way. It can do so by bringing improvements in the existing curriculum, textbooks, methods of teaching and evaluation.

4. Education is considered as much as science as an art. As a science, it has a corpus of knowledge concerning the nature of human mind, its growth and development; theories of administration and supervision; educational programmes and practices prevalent in different countries and their results. The quantum of knowledge is indicated by the courses in education prescribed by various organizations and institutions for earning degrees in the field and also by research material which is being produced and and continuously reported in different educational research journals. Since education depends on a corpus of knowledge, There is need to add scientific knowledge to it for improvement and enrichment. This will facilitate making adjustments in educational programs accordingly. As an art, education seeks to impart to impart knowledge effectively. For example, "How the teacher can play effective role in the classroom and outside?" is a vital question before educationists, and needs careful research efforts to enhance teacher's effectiveness.

5. The slogan of democratization of education since 1870 resulted in the expansion of education. It has given rise to numerous problems like the problems of individual differences expansion, buildings, discipline and so on. Solutions of such problems by trial and error by experience from tradition and authority often yield erroneous results. Moreover growth by experience is very slow and accidental. We need solutions based on research so that the coming generation is not left to the mercy of errors of outright sins of tradition, ignorance and prejudice.

2.4 PURPOSE OF EDUCATIONAL RESEARCH

Research is a purposeful activity that is carried out by the scientific community as the need has been felt by them to seek the answers and solutions to the existing problems faced by mankind. We as humans will never be free from problems, The quest for inquiry

continues and so is the case with knowledge creation and validation. Therefore it can be said that research serves various purposes, as given below:

Progress and good life: The purpose of research is progress and good life. Good education has been recognized as the basis of individual and social development. Therefore, the need of research in educational practices and policies is being realized increasingly. Educationists are constantly searching for more effective methods of instruction. Efforts are being made to find out more satisfactory techniques of evaluation, richer learning materials, better physical facilities, more efficient system of administrative organization, and so on. This search is becoming more important due to the very rapid expansion and democratization of education during the last few decades. According to the article 26(1) of the universal declaration of Human rights, "Every one has the right of education. Education shall be free at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and Professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit."

To realize this goal, the nations of the world will have greatly to expand this educational effort, more facilities must be provided, more teachers must be trained, new curricula must be developed; and new teaching material must be provided. It is conceivable that this can be done at all, without detailed guidance from the facts collected and the principles established through educational research.

System : Defining research J.W Best, "Research is considered to be more formal, systematic, intensive process of carrying on the scientific method of analysis. It involves a more systematic structure of investigation, usually resulting in some sort of formal record of procedures and a report of results or conclusions."

Economy: Decisions based on systematic research in education save time, energy and a lot of failure and frustration. These show us the path of progress. According to the International Bureau of Education, "In many of its recommendations, The international conference on public education has stressed the need for psycho-educational knowledge of the child as the starting point for any educational activity. It has also shown that research formed an indispensable basis for any national organization of the education especially as regard curricula syllabuses and methods as well as for financing education, for its planning, and for the building of schools"

Problem solving: Research is an activity whose main purpose is to solve the existing problems related to education. These problems may be faced by students or teachers or school leaders or parents or any other stake holders or an educational institution or a community or a nation at large. In education, they may the best method of teaching a language? How can scientific creativity be fostered among children? etc. all these problems involve relatively more effective ways of promoting learning and development. In each of the problems, the researcher's main objective is to find out the solutions so that the same can be applied by the others to solve their educational problems. For example if a researcher did experimental research, use multimedia or ICT to teach a particular subject and get better results than we can generalize that use of multimedia/ ICT helps in facing difficulty in teaching a specific subject to a classroom and the teacher as a researcher finds out the solution, then similar solutions could be applied by other teachers to solve the classroom teaching problems.

Generation of Knowledge: Research helps us verify existing knowledge and if necessary, generate new knowledge. For example, various theories of learning explain how human beings learn, Behaviorist theory of learning explains how habits can be formed, information-processing theory explains how we process various types of sensation, how we make meaning of them and what role our memory plays, how we store information and how memory is organized. Research that leads to generation of knowledge is therefore very carefully planned and conducted in controlled situations. such research is concerned with theory building and as known as basic research, also called fundamental research.

Action in specific situation: Educational research also demands not only finding out the solution of the problem but also expects the solutions should immediately be applied. But applying the solution, Researchers should keep in mind the content specificity of the solution. What do you mean by context specificity? Researchers must bear in mind that the nature of the problems may be the same but solutions may not be replicable in totality, therefore one should look in to situations and find out the differences, and these differences in the situations demand specific actions /solution.

Training for future researchers: Another main purpose of research is to provide knowledge and skills to build the capabilities of young researcher. As we already know research is an activity that is not only scientific but also requires an inquisitive mind, scientific

temperament, critical thinking ability and most importantly carried out in a systematic and organized manner, So personnel to researcher must be trained in these areas before becoming a researcher. So, good social scientists always train their young researchers on the above mentioned aspects.

2.5 CHECK YOUR PROGRESS

Note: a) Write your answers in the space given below.

b) Compare your answers with those given at the end of the lesson.

1. Why do you want to do research? Give any two reasons.

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2. What are the needs of educational research?

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2.6 LESSON END EXERCISE :

1. Why Research is Important to Students?
2. What are the four 4 purposes of research?
3. What is purpose of research in education?
4. State the purpose of Education Research?

2.7 SUGGESTED FURTHER READINGS

1. Opie, C. (2004). What is educational research? In Clive Opie(Ed.) Doing Educational Research: A Guide to First-Time researchers (Ed.), Sage Publications retrieved from <https://pdfs.semanticscholar.org/c55f/01557a48995f22fbf73734265144abcb69f6.pdf>

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3. Sanswal, D. N.(2020). Research methodology and applied statistics, New Delhi: Shipra Publications
4. University of Mumbai (n.d) Module on Educational ResearchIII retrieved from http://archive.mu.ac.in/myweb_test/ma%20edu/Research%20Methodology%20-20III.pdf

2.8 ANSWER TO CHECK YOUR PROGRESS

1. (i) To understand a phenomenon, situation, or behavior under study.
(ii) To test existing theories and to develop new theories on the basis of existing ones.
(iii) To answer different questions of "how", "what", "which", "when" and "why" about a phenomenon, behavior, or situation.
2. Educational researchers seek to determine why certain things work better than others when it comes to teaching and learning. They also look at what methods are effective at promoting learning in general. This includes identifying problems that exist within the current system and developing possible solutions for them

**TITLE: AREAS OF EDUCATIONAL RESEARCH: PHILOSOPHICAL,
PSYCHOLOGICAL AND SOCIOLOGICAL**

STRUCTURE

- 3.1 Objectives
- 3.2 Introduction: Areas of Educational Research
- 3.3 Philosophical Areas of Educational Research
- 3.5 Psychological Areas of Educational Research
- 3.6 Sociological Areas of Educational Research
- 3.7 Let Us Sum Up
- 3.8 Lesson End Exercise
- 3.9 Suggested Further Readings
- 3.10 Answer to Check Your Progress

3.1 OBJECTIVES:

After reading this lesson, you shall be able to:

know about different areas of educational research

explain the philosophical, psychological and sociological areas of research

3.2 AREAS OF EDUCATIONAL RESEARCH

Education as a process takes in to account both the science of education and the

art of education. The science of education comprises the corpus of knowledge which is largely responsible for making the art of education more effective. The art of education has relevance to class-room practices and for effective dialogue between the teacher and the pupils. Since knowledge is expanding rapidly in all the disciplines including education, there is need to extend the frontiers of knowledge in areas which constitute the science of education.

Considering this point of view, the fields of educational research can be classified in terms of the following content areas:

1. Psychology of Education
2. Philosophy of Education
3. Sociology of Education
4. Economics of Education
5. Education Management and Administration
6. Comparative Education
7. Educational Measurement and Test Development
8. Curriculum, Textbooks and Methods
9. Teacher Education and Teaching Behaviour
10. Guidance and Counselling
11. Educational Technology

3.3 PHILOSOPHICAL AREA OF EDUCATIONAL RESEARCH

Education has been called the dynamic side of philosophy or an active aspect of philosophic belief. Its theory and practice can never attain perfection unless it is based on the sound footing of a systematic philosophy.

The philosophical area of educational research delves into fundamental questions and issues related to the nature, purpose, and methods of education. It explores the underlying

philosophical assumptions that guide educational practices and policies. Here are key themes within the philosophical area of educational research:

Epistemology in Education:

Investigating how knowledge is acquired, justified, and transmitted within educational settings. This involves examining different theories of learning and understanding. The curriculum also raises some important questions of epistemology. It is the student's avenue of approach to knowledge. It makes us understand the nature of knowledge. The nature of knowledge has an influence on the way in which the curriculum is organized and taught. It also helps to determine the shape of teaching learning strategy.

Ethics in Education:

Exploring moral and ethical considerations in education, including questions about the responsibilities of educators, ethical dilemmas in teaching, and the moral development of students. Ethical dimensions help in formulating the theory of education in its most general phases. In examining the aims of education, the motivation of learning, or the measurement of its results, we are dealing with ethical problems, the problem of values. Ethical considerations also come up unavoidably in examining the social or political setting of the educative process. Values are also important considerations in selecting which studies should be included in the curriculum.

Logic: Among philosophical dimensions, logical dimensions reveal various significant roles which logic can perform in the formulation of educational concepts, generalizations and analogies, and in drawing out of educational inferences. Logic can also help in curriculum framing and it can provide the very basis of the teaching -learning process. It is therefore needed to find out as to how many possible logical operations are involved in teaching learning process.

Social and Political Philosophy of Education:

Analyzing the relationship between education and societal structures, including discussions on social justice, equality, and the role of education in shaping citizenship.

Critical Pedagogy:

Drawing on critical theory, critical pedagogy explores how education can be a tool for

social transformation and liberation, challenging power structures and promoting social justice.

Existentialism in Education:

Examining existentialist perspectives on education, which emphasize individual freedom, responsibility, and the search for meaning in the educational experience.

Pragmatism and Education:

Exploring the pragmatic philosophy of education, which focuses on the practical consequences of educational practices and the application of knowledge in real-world situations.

Post modernism in Education:

Critically examining postmodern perspectives on education, which question grand narratives, challenge authority, and emphasize the diversity of perspectives in educational settings.

Feminist Philosophy of Education:

Analyzing how gender issues intersect with education, addressing questions of equality, representation, and the role of education in challenging or perpetuating gender norms.

Cultural Philosophy of Education:

Investigating the influence of culture on educational practices, exploring how cultural diversity is recognized and addressed within educational settings.

Environmental Philosophy of Education:

Examining the relationship between education and the environment, considering how educational practices contribute to environmental awareness, sustainability, and ecological responsibility.

Aesthetic and Aesthetic Education:

Exploring the role of aesthetics and the arts in education, including discussions on creativity, imagination, and the cultivation of aesthetic sensibilities in students.

Researchers in the philosophical area of educational research often engage in theoretical inquiries, examining the conceptual foundations that underpin educational theories and

practices. Their work contributes to a deeper understanding of the philosophical dimensions of education and informs discussions about the purpose and direction of educational systems.

3.4 PSYCHOLOGICAL AREA OF EDUCATIONAL RESEARCH:

The psychological area of educational research focuses on understanding the cognitive, emotional, social, and developmental aspects of learning and education. Researchers in this field explore various psychological phenomena to enhance teaching methods, improve student outcomes, and contribute to the overall effectiveness of educational systems. Here are key themes within the psychological area of educational research:

Cognitive Development:

Investigating how cognitive processes, such as memory, attention, problem-solving, and decision-making, develop in students at different ages and stages of education.

Learning Theories:

Exploring and testing various theories of learning, including behaviorism, cognitivism, constructivism, and socio-cultural theories, to understand how students acquire knowledge and skills.

Motivation and Engagement:

Studying factors that influence student motivation, engagement, and persistence in educational activities, including the impact of intrinsic and extrinsic motivators.

Social and Emotional Learning (SEL):

Researching the role of social and emotional factors in education, such as emotional intelligence, social skills, and their impact on academic achievement and well-being.

Educational Neuroscience:

Examining the intersection of neuroscience and education to understand how the brain processes information and how educational practices can be informed by neuroscientific research.

Educational Psychology Interventions:

Developing and assessing the effectiveness of interventions based on psychological principles

to address learning difficulties, enhance academic performance, and promote positive behavior.

Assessment and Measurement:

Investigating methods of assessing student learning, including the development and validation of educational assessments, standardized tests, and alternative forms of evaluation.

Inclusive Education and Special Education:

Researching the psychological aspects of inclusive education, including strategies to support students with diverse learning needs and the psychological well-being of students with disabilities.

Developmental Psychology in Education:

Examining how psychological development influences learning, including research on developmental milestones, cognitive stages, and the impact of socio-emotional development on academic success.

Educational Technology and Psychology:

Studying the psychological impact of technology on learning, including research on online education, digital tools, and the use of educational technology in the classroom.

Teacher-Student Relationships:

Investigating the dynamics of teacher-student relationships, their impact on academic achievement, socio-emotional development, and overall well-being.

Peer Interactions and Group Dynamics:

Exploring the psychological aspects of peer interactions and group dynamics within educational settings, including studies on collaboration, peer influence, and social relationships.

Educational Counseling and Mental Health:

Researching the psychological well-being of students, addressing mental health issues, and examining the role of educational counseling in supporting students' emotional and psychological needs.

Researchers in the psychological area of educational research employ various research methods, including experiments, surveys, observations, and interviews, to gain insights into the psychological processes underlying educational phenomena. Their work contributes to evidence-based practices and policies in education, with the goal of enhancing the learning experience for students.

3.5 SOCIOLOGICAL AREAS OF EDUCATIONAL RESEARCH:

The sociological area of educational research examines the relationship between education and society, investigating how social structures, institutions, interactions, and inequalities impact educational processes and outcomes. Researchers in this field explore the societal factors that shape education and how education, in turn, influences broader social dynamics. Here are key themes within the sociological area of educational research:

Social Inequality in Education:

Examining how factors such as race, ethnicity, socioeconomic status, gender, and cultural background influence access to educational opportunities and outcomes.

Educational Institutions as Social Structures:

Analyzing schools, colleges, and universities as social institutions and understanding how their structures contribute to or mitigate social inequalities.

Educational Policies and Equity:

Investigating the impact of educational policies on different social groups and assessing how policies contribute to or alleviate disparities in educational attainment.

Socialization and Identity Formation:

Exploring how schools contribute to the socialization process, shaping individuals' identities, values, and beliefs.

Educational Stratification:

Studying how educational systems stratify individuals based on various factors, leading to the reproduction of social inequalities.

Teacher-Student Interactions:

Analyzing the dynamics of interactions between teachers and students and how these interactions may reinforce or challenge societal norms and expectations.

Cultural Capital and Education:

Investigating how cultural resources, knowledge, and practices contribute to educational success and social mobility.

Globalization and Education:

Examining the impact of globalization on education, including issues related to internationalization of education, cross-cultural learning, and the global flow of educational policies.

Critical Pedagogy:

Exploring approaches to education that aim to challenge and transform social inequalities through critical reflection and action.

Educational Attainment and Employment:

Investigating the relationship between educational attainment and employment opportunities, wage disparities, and social mobility.

Technology and Education:

Studying how technological advancements influence educational processes, access to information, and the digital divide in different social groups.

Social Movements and Education:

Examining the role of social movements in advocating for educational reform and challenging inequities within the education system.

Researchers in the sociological area of educational research use a combination of qualitative and quantitative methods, such as surveys, interviews, observations, and statistical analyses, to explore these themes. The goal is to understand the complex interplay between education and society and contribute to the development of more equitable and inclusive educational systems. The findings from sociological research in education often inform policy decisions and educational practices aimed at addressing social issues and promoting social justice

within the educational context.

3.6 CHECK YOUR PROGRESS

1. Mention the major areas of educational research
.....
.....
.....
2. Inter-disciplinary means combination of more than two different subjects into one activity. (true/false)

3.7 LET US SUM UP:

In this lesson, we have discussed research, educational research and areas of educational research. We have also learned that there are several possibilities for categorizing areas of educational research. Philosophy, sociology, psychology, economics, history etc. are the some of the specifics areas of educational research.

3.8 ANSWERS TO CHECK YOUR PROGRESS

1. a. Problems relating to content of education.
b. Problems relating to the different stages and sectors of education.
c. Problems relating to teaching process.
2. True.

3.9 SUGGESTED READINGS :

1. Best, John W, "Research in Education", Englewood Cliffs, N.J: Prentice-Hall, Inc, 1977.
2. Koul, Lokesh, "Methodology of Education Research", Vikas Publishing House Pvt. Ltd: New Delhi, 1988.
3. Sidhu, Kulbir Singh "Methodology of Research in Education", Sterling; New Delhi, 1985

3.10 LESSON END EXERCISE

1. Classified the different field of educational research.
3. Explain the Philosophical, Psychological and Sociological areas of research

Structure

4.1.0 Objectives

Introduction to Educational Research

Key Components

Importance

Challenges

Types of Educational Research

Fundamental Research

Need

Conducting Fundamental Research

Objectives

Characteristics

Methods and Approaches

Impact and Benefits

Applied research

Impact on Decision Making

Need

Objectives

4.5.0 Let'sSum up

4.6.0 CheckYourProgress

4.7.0 SuggestedReadings

4.1.0 OBJECTIVES:

Students, after reading this topic, will be able to:

- To improve research literacy and ethics of educational research.
- To critically evaluate educational research & understanding the implications of research findings.
- To identify educational issues and problems that address specific challenges in educational settings.
- To improve their ability to communicate effectively through reports, presentations and publications.
- To make evidence-based decisions in educational context.

Introduction to Educational Research

Educational research is a systematic process of investigating and studying various aspects of education to enhance our understanding of how people learn, how educational systems function, and how to improve teaching and learning practices. It is aimed at gaining a deeper understanding of various aspects of education, from teaching and learning methods to educational policies and practices.

Purpose: The primary purpose of educational research is to generate knowledge that can inform and improve educational policies, practices, and outcomes. It aims to address questions and issues related to teaching, learning, curriculum development, assessment, and educational policies. Educational research exhibits several distinctive features that set it apart from other types of research. These features highlight the specific nature and focus of research within the field of education:

- o **Learner-Centered:** Educational research places a central focus on learners, their needs, experiences, and outcomes. Researchers often examine how various factors, including teaching methods, curriculum design, and educational environments, impact the learning process.
- o **Applied Orientation:** Much of educational research is oriented toward practical applications. Researchers seek solutions to real-world educational problems and aim to improve teaching and learning practices, making it highly relevant to educators, policymakers, and practitioners.
- o **Interdisciplinary:** Educational research draws from various disciplines, including psychology, sociology, anthropology, economics, and pedagogy. This interdisciplinary approach allows for a comprehensive understanding of educational phenomena.
- o **Variety of Research Designs:** Educational research employs diverse research designs, including experimental, descriptive, correlational, and qualitative methods, depending on the research question and goals. Researchers choose the most suitable design to investigate specific educational issues.
- o **Context Sensitivity:** Education is influenced by cultural, societal, and contextual factors. Educational research takes these influences into account when examining the impact of educational practices and policies across different settings and populations.
- o **Longitudinal Studies:** Some educational research involves longitudinal studies that track individuals or groups over an extended period. This approach provides insights into how educational experiences shape long-term outcomes.
- o **Informed by Theory:** Educational research often relies on educational theories and models to guide investigations. Theoretical frameworks help researchers conceptualize and interpret findings within a broader educational context.
- o **Ethical Considerations:** Ethical principles are critical in educational research, particularly when working with human participants, such as students, teachers, or administrators. Researchers must ensure the ethical treatment of participants and obtain informed consent when necessary.

- o **Impact on Policy and Practice:** Educational research frequently informs educational policies, curriculum development, instructional strategies, and teacher training. Research findings have the potential to influence decision-making at various levels of the education system.
- o **Continuous Improvement:** The dynamic nature of education means that research in this field is ongoing. Researchers continually strive to address emerging challenges and adapt to changing educational needs, contributing to the continuous improvement of educational systems.
- o **Peer Review:** Educational research undergoes rigorous peer review processes to maintain quality and credibility. Peer-reviewed journals and conferences are common outlets for disseminating research findings.
- o **Collaboration:** Collaborative research efforts are prevalent in education, involving researchers, educators, policymakers, and other stakeholders. Collaboration enhances the relevance and applicability of research outcomes.

Educational research exhibits features that emphasize its learner-centered, practical, interdisciplinary, and context-sensitive nature. It aims to inform educational practices and policies, contribute to the well-being of learners, and facilitate improvements in education at various levels.

Key Components:

- **Hypothesis:** Educational research often starts with a hypothesis or research question that the study seeks to answer.
- **Data Collection:** Researchers collect data through surveys, interviews, observations, experiments, or reviews of existing literature.
- **Data Analysis:** Data is analyzed using statistical methods, content analysis, or qualitative coding, depending on the research design.
- **Findings:** The results of the search are presented, which may include statistical findings, trends, or qualitative insights.
- **Implications:** Researchers discuss the implications of their findings for educational practices, policies, or future research.

Importance:

- Improving Education: Educational research helps identify effective teaching methods, curriculum design, and educational policies, leading to better educational outcomes.
- Informed Decision-Making: Policymakers, educators, and administrators use research findings to make informed decisions about educational programs and initiatives.
- Professional Development: Educators can use research to enhance their teaching skills and adapt to changing educational needs.

Challenges:

- ✓ Complexity: Education is a multifaceted field with various variables that can be challenging to study and measure.
- ✓ Ethical Considerations: Researchers must consider ethical guidelines when working with human subjects, especially in educational settings.
- ✓ Limited Funding: Educational research often relies on funding, which can be limited, affecting the scope of research projects.
- ✓ Educational research is a systematic inquiry into various aspects of education, aimed at generating knowledge that can inform and improve teaching and learning practices, curriculum development, and educational policies. It plays a crucial role in advancing education and facilitating evidence-based decision-making in the field.
- ✓ In essence, educational research is a diverse and dynamic field that explores a wide range of educational topics using various research methods and approaches. Its findings contribute to the improvement of teaching and learning, educational policies, and the overall quality of education at different levels and in diverse contexts.

Types of Educational Research

Educational research encompasses a variety of research types, each serving specific

purposes and addressing different educational questions. Different types of educational research serve diverse purposes and contribute to the broader understanding of education, helping to shape policies, inform teaching practices, and address the unique challenges within the field. Researchers choose the most appropriate type based on their research questions and objectives.

Fundamental Research

Fundamental research is a research approach that is entirely theoretical and aimed at improving or expanding the knowledge-base of a particular field of study. It focuses on "knowledge for its own sake" and it is primarily driven by curiosity and the need to explore the unknown. It is also known as basic or pure research and it is a systematic investigation set to achieve a better and more detailed understanding of a research subject or phenomenon, not to solve a specific problem. A type of scientific inquiry aimed at advancing knowledge and understanding of a particular field without any immediate or practical application. It is driven by intellectual curiosity and the desire to explore the fundamental principles, theories, and concepts underlying a subject area. Here's a detailed explanation of basic research:

Need:

Fundamental research in the educational process is essential for several reasons:

- a. **Understanding Foundations:** Fundamental research helps educators and researchers understand the foundational principles of education, such as how learning occurs, cognitive development, and effective teaching methods. This knowledge forms the basis for effective educational practices.
- b. **Innovation and Improvement:** It drives innovation and improvement in education by exploring new theories, ideas, and approaches. This research can lead to the development of more effective teaching methods, curriculum design, and educational technologies.
- c. **Evidence-Based Practices:** Fundamental research provides the evidence needed to support or debunk various educational practices. It helps educators make informed decisions about what works best in the classroom.

- d. **Addressing Complex Issues:** Many complex educational issues, such as achievement gaps, diversity and inclusion, and the impact of socio-economic factors on learning, require in-depth understanding through fundamental research to develop solutions.
- e. **Policy Development:** Policymakers rely on research findings to develop effective educational policies and allocate resources wisely. Fundamental research provides the data and insights needed for evidence-based policymaking.
- f. **Professional Development:** Fundamental research informs teacher training and professional development programs. Teachers can benefit from research-based strategies to enhance their teaching skills.
- g. **Long-Term Impact:** Research in education has a long-term impact on society. Discoveries made through fundamental research can shape the education system, influence educational standards, and ultimately affect the quality of education for generations.
- h. **Global Competitiveness:** In a rapidly changing world, nations that invest in fundamental research in education can gain a competitive edge by producing a highly skilled and adaptable workforce.

On whole, fundamental research in the educational process is crucial for advancing education, fostering innovation, and addressing the complex challenges that arise in educational systems. It forms the foundation upon which evidence-based practices and policies are built.

Conducting fundamental research in education involves a systematic and rigorous process. The key steps to guide are as follows:

1. **Select a Research Topic:**
 - Identify a specific educational topic or question that interests you and is relevant to the field.
 - Ensure that your research question is clear, focused, and researchable.
2. **Review Existing Literature:**

- Conduct a thorough literature review to understand what has already been studied in your chosen area.
 - Identify gap so run answered questions in the existing research that your study can address.
- 3. Formulate a Research Hypothesis or Question:**
- Develop are search hypothesis or research question that you intend to investigate.
 - Ensure your hypothesis/question is testable and aligned with the existing literature.
- 4. Choose a Research Design:**
- Select a research design that suits your research question. Common designs in education research include experimental, survey, case study, and qualitative research.
 - Decide on the data collection methods and instruments (e.g., surveys, interviews, observations) you will use.
- 5. Ethical Considerations:**
- Obtain necessary approvals and permission sify our research involves human participants, ensuring ethical standards are met.
 - Protect the privacy and rights of participants, and obtain informed consent when applicable.
- 6. Data Collection:**
- Collect data according to your chosen research design.
 - Maintain accurate records of your data collection process.
- 7. Data Analysis:**
- Analyze the data using appropriate statistical or qualitative analysis methods.
 - Interpret the results in the context of your research question and hypothesis.
- 8. Draw Conclusions:**
- Based on your analysis, draw conclusions that address your research question or

hypothesis.

- Discuss the implications of your findings and their significance in the field of education.

9. Write a Research Report:

- Prepare a well-structured research report or paper following academic conventions (e.g., APA, MLA, Chicago style).
- Include sections such as an introduction, literature review, methodology, results, discussion, and conclusion.

10. Peer Review and Feedback:

- Seek feedback from peers, advisors, or mentors to refine your research and address any weaknesses.

11. Publication:

- Consider submitting your research to academic journals or presenting it at conferences to share your findings with the academic community.

12. Continuous Learning:

- Stay updated with developments in your field and continue learning to improve your research skills.
- Be open to revising and expanding your research based on new insights and emerging research.

13. Documentation and References:

- Properly cite and reference all sources of information used in your research to avoid plagiarism.

Remember that fundamental research in education can be a time-consuming and iterative process. Patience, attention to detail, and a commitment to rigor are essential for producing high-quality research in this field.

Objectives:

The objectives of fundamental research, also known as basic research, revolve around

advancing our understanding of the fundamental principles, theories, and phenomena within a specific field of study. These objectives are primarily driven by intellectual curiosity and the desire to explore the unknown. The primary goal of fundamental research is to expand the boundaries of knowledge within a specific discipline. It seeks to answer fundamental questions, uncover underlying principles, and develop new theories.

Fundamental research is often driven by researchers' curiosity and the desire to explore the unknown rather than solving a practical problem or addressing an immediate need.

- **Expand Knowledge:** The primary aim of fundamental research is to expand the boundaries of knowledge within a particular discipline. Researchers seek to answer fundamental questions, explore uncharted territories, and gain a deeper understanding of the subject matter.
- **Test and Develop Theories:** Fundamental research often involves the testing and development of theories and models that explain natural, physical, or social phenomena. Researchers aim to refine existing theories or propose new ones to account for observed phenomena.
- **Discover New Phenomena:** Researchers in fundamental research may stumble upon entirely new phenomena, relationships, or principles that were previously unknown. These discoveries can open up new avenues of inquiry and exploration.
- **Understand Cause-and-Effect Relationships:** Researchers investigate cause-and-effect relationships in various domains, seeking to uncover the underlying mechanisms behind observed phenomena. This can lead to a more profound comprehension of how the world works.
- **Provide a Theoretical Framework:** Fundamental research contributes to the development of a theoretical framework that can guide future research, both within the specific field and in related disciplines.
- **Foster Intellectual Curiosity:** It encourages intellectual curiosity and a sense of wonder, inspiring researchers to ask deeper and more fundamental questions about the natural or social world.
- **Support Applied Research:** While not its primary goal, fundamental research

often serves as the foundation for applied research. Discoveries and insights gained from basic research can inform practical applications and innovations in technology, medicine, engineering, and other fields.

- **Contribute to Scientific Progress:** Fundamental research is an essential driver of scientific progress. It adds to the body of scientific knowledge, enriching our understanding of the world and helping us make sense of complex phenomena.
- **Educational Value:** Fundamental research contributes to the education and training of future scientists, researchers, and scholars. It provides valuable opportunities for students to engage in intellectually stimulating research activities.
- **Long-Term Impact:** The impact of fundamental research is often long-term and may not be immediately apparent. However, over time, the knowledge generated from basic research can lead to breakthroughs, innovations, and advancements in various fields.
- **Cultural and Societal Value:** Fundamental research enhances our cultural and societal understanding of the world. It fuels our collective curiosity and helps us appreciate the beauty and complexity of the universe.
- **Promote Interdisciplinary Collaboration:** Fundamental research often involves collaboration between researchers from different disciplines. This interdisciplinary approach can lead to innovative perspectives and solutions to complex problems.

The objectives of fundamental research are driven by the pursuit of knowledge for its own sake. While the immediate practical applications may not be evident, the long-term impact on scientific progress, innovation, and our understanding of the world is profound and enduring.

Characteristics:

Exploratory: Basic research often delves into uncharted territory, seeking to discover new phenomena or relationships.

Theoretical: It frequently relies on the development or testing of theories and models to explain natural or social phenomena.

No Immediate Application: Unlike applied research, basic research does not have an immediate practical or commercial application. Its benefits may become apparent only in the long term.

High Degree of Uncertainty: Researchers may not know the precise outcomes or implications of their investigations, which can lead to unexpected discoveries.

Methods and Approaches:

Fundamental research employs a wide range of research methods, including experiments, observations, surveys, and theoretical modeling, depending on the nature of the research question. Researchers often collaborate across disciplines to bring diverse perspectives to their investigations.

Examples:

In physics, the study of subatomic particles, like quarks and neutrinos, is a classic example of basic research. Understanding these particles contributes to our knowledge of the fundamental building blocks of the universe.

In biology, basic research might involve exploring the mechanisms of genetic inheritance, which led to the discovery of the structure of DNA by James Watson and Francis Crick.

In social sciences, studying human behavior and cognitive processes without a specific practical application can yield insights into fundamental aspects of psychology and sociology.

Impact and Benefits:

The impact of Fundamental or basic research is often indirect and long-term. Discoveries made in basic research can serve as the foundation for applied research and innovation in various fields.

Basic research can lead to unexpected breakthroughs and innovations in the future. Many practical applications, such as technological advancements, have roots in basic research.

While the immediate benefits may not be apparent, the cumulative knowledge gained from basic research enriches human understanding and contributes to the advancement of society.

Funding and Support:

Fundamental research is sometimes funded by government agencies, foundations, and universities because of its potential for long-term societal benefits and scientific progress.

It often requires a degree of patience and tolerance for uncertainty on the part of funders, as the outcomes may not be immediately tangible or marketable.

Fundamental or Basic research is a vital component of the scientific and academic community's pursuit of knowledge. It focuses on expanding our understanding of fundamental principles and theories, laying the groundwork for future discoveries and innovations in various fields. While the practical applications may not be immediately obvious, the long-term impact of basic research on society and human knowledge is profound.

Applied Research:

Applied research refers to a non-systematic approach that provides solutions to specific problems or issues. These issues can range from a personal one to a group or societal one. Due to its direct approach to finding solutions, it is called a non-systematic approach. An applied research process is often seen as a scientific process because the tools of science are applied practically to reach a conclusion. Applied research is a type of scientific investigation that focuses on solving practical problems, answering specific questions, or addressing immediate real-world challenges. Unlike fundamental or basic research, which aims to expand general knowledge and understanding, applied research is concerned with the practical application of knowledge to practical issues. The concept of applied research revolves around conducting systematic investigations with the primary goal of addressing practical problems, answering specific questions, or solving real-world challenges. Unlike basic or fundamental research, which seeks to expand general knowledge, applied research is focused on the practical application of knowledge to address immediate and tangible issues. Here's a comprehensive explanation of the concept of applied research:

- o **Practical Problem Solving:** Applied research is driven by the need to solve specific, practical problems or address pressing issues faced in various domains, including science, technology, business, healthcare, education, and social sciences.

- o **Real-World Application:** It is highly application-focused, with the aim of using existing knowledge, theories, and principles to develop solutions, strategies, or interventions that can be directly applied to real-world situations.
- o **Context-Specific:** Applied research is context-specific, meaning it is tailored to the unique needs and circumstances of the problem or challenge at hand. Researchers often collaborate with stakeholders to define research objectives and parameters.
- o **Action-Oriented:** Researchers in applied research often take concrete actions based on their findings. This may involve developing new technologies, implementing interventions, formulating policies, or making operational changes to address the identified problem.
- o **Immediate Relevance:** Applied research aims to produce results and solutions in a timely manner to address current and immediate concerns. The research outcomes are directly relevant and useful in addressing specific issues.
- o **Empirical Investigation:** Applied research relies on empirical methods, data collection, and evidence-based analysis to assess the feasibility, effectiveness, and efficiency of interventions, products, or strategies.
- o **Interdisciplinary Nature:** It can span multiple disciplines, incorporating knowledge and methodologies from various fields to tackle complex problems holistically. Examples: In healthcare, clinical trials to evaluate the effectiveness and safety of a new drug are classic examples of applied research aimed at improving patient outcomes.

In the business world, market research is applied research that helps companies make informed decisions about product development, marketing strategies, and consumer preferences.

In education, applied research may involve developing and testing new teaching methods or educational technologies to enhance student learning.

Impact on Decision-Making:

The findings and recommendations of applied research often influence decision-making processes, leading to changes in policies, practices, product designs, and strategic plans.

Continuous Improvement: Applied research can lead to an iterative process of continuous improvement, where initial solutions are refined and enhanced based on feedback and further research.

Feedback Loop, The results of one applied research study can inform subsequent research efforts, creating a feedback loop that contributes to ongoing improvements and innovations.

The concept of applied research centers on addressing practical challenges and providing solutions by using empirical methods and existing knowledge. Its results are directly relevant and actionable, making it a valuable approach for addressing real-world issues in various fields.

Need:

Applied research in the educational process is vital for several reasons:

- a) **Practical Solutions:** Applied research aims to solve real-world problems in education. It directly addresses challenges faced by educators, students, and educational institutions, providing practical solutions.
- b) **Improving Teaching and Learning:** It helps identify and develop effective teaching methods, curriculum designs, and educational interventions. This leads to improved learning outcomes for students.
- c) **Assessment and Evaluation:** Applied research in education contributes to the development of better assessment tools and evaluation methods. This ensures that educators can accurately measure student progress and make informed instructional decisions.
- d) **Tailored Interventions:** Researchers can design interventions and programs specifically tailored to the needs of diverse student populations, including those with special needs or from disadvantaged backgrounds.
- e) **Professional Development:** Applied research supports the continuous professional development of teachers and administrators by providing evidence-based strategies and practices that enhance their skills and knowledge.

- f) **Inclusion and Equity:** It focuses on promoting inclusivity and equity in education, helping to bridge achievement gaps and create a more equitable learning environment.
- g) **Policy Impact:** Policymakers rely on applied research findings to make informed decisions about education policies and resource allocation, ensuring that public education systems are efficient and effective.
- h) **Feedback Loop:** Applied research establishes a feedback loop between researchers and practitioners. Educators can provide valuable insights, and researchers can adapt their work to address the evolving needs of the education system.
- i) **Innovation in Technology:** With the rapid advancement of technology, applied research in education helps identify how to effectively integrate technology into the classroom and online learning environments.
- j) **Economic and Social Impact:** High-quality education has a profound impact on a country's economic and social development. Applied research contributes to achieving educational goals and, consequently, broader societal benefits.

Applied research in the educational process serves as a bridge between theoretical knowledge and practical application. It directly benefits teachers, students, schools, and educational systems by offering evidence-based strategies and solutions to enhance the quality and effectiveness of education.

Objectives:

The objectives of applied research are highly practical, focusing on addressing specific real-world problems, answering concrete questions, and providing actionable solutions or recommendations. Applied research is driven by the need to bring about practical improvements, advancements, or innovations in various fields. Detailed explanation of the objectives of applied research:

1. **Solving the problems:** The primary objective of applied research is to identify, analyze, and solve practical problems encountered in specific domains, such as healthcare, business, education, engineering, and social sciences. Researchers aim to find practical and effective

solutions to issues that impact individuals, organizations, or society as a whole. Applied research is characterized by its commitment to applying existing knowledge, theories, and principles to address real-world challenges. It seeks to translate theoretical concepts into tangible actions and results.

2. Actionable Insights: Applied research is designed to provide actionable insights, recommendations, or interventions that can be readily implemented to bring about positive change or improvement in a specific context.

3. Specific Objectives: It sets clear and specific objectives, often defined in collaboration with stakeholders, to guide the research process. These objectives are aimed at resolving particular issues or achieving predefined goals.

4. Contextual Understanding: Applied research seeks to gain a deep understanding of the specific context and conditions surrounding the problem. This context-awareness is crucial for tailoring solutions to fit the unique circumstances.

5. Empirical Investigation: Researchers collect empirical data through various methods, such as surveys, experiments, observations, and interviews, to support their findings and recommendations. The data gathered allows for evidence-based decision-making and the assessment of the feasibility, effectiveness, and efficiency of proposed solutions.

6. Timely Results: Applied research aims to produce timely results. It operates on relatively short timeframes to address current and pressing concerns, making it relevant and responsive to immediate needs.

7. Interdisciplinary Approach: It often involves an interdisciplinary approach, drawing on knowledge and methodologies from multiple fields to provide comprehensive and holistic solutions to complex problems.

8. Innovation and Improvement: Applied research encourages innovation and continuous improvement by developing and testing new strategies, technologies, products, or services. It contributes to advancements in various sectors, driving progress and competitiveness.

9. Feedback for Iteration: Applied research frequently results in feedback loops, where findings and recommendations from one study inform subsequent research and refinement of solutions. This iterative process can lead to ongoing enhancements.

10. Measureable Outcomes: Applied research sets measurable outcomes or success criteria to evaluate the effectiveness of interventions or solutions. This allows for the assessment of whether the objectives have been met.

The objectives of applied research revolve around practical problem-solving, providing actionable solutions, and making a tangible impact in specific domains. It is characterized by its context-specific approach, empirical investigation, and commitment to addressing pressing issues to bring about positive change and progress.

4.5.0 LET'S SUM UP:

Educational research is a systematic and scholarly inquiry into various aspects of education. Its primary goal is to advance knowledge and understanding in the field of education.

It encompasses a wide range of topics and methodologies, including pedagogy, learning theory, policy analysis, and more.

Educational research contributes to the development of theories, informs teaching practices, and influences educational policies.

Fundamental Research in Education:

Fundamental research in education focuses on exploring foundational principles and theoretical underpinnings of educational phenomena.

It aims to expand theoretical knowledge and often addresses broad, abstract questions in education.

Fundamental research provides a theoretical basis upon which applied research can build. **Applied Research in Education:**

Applied research in education is geared towards addressing practical issues and solving real-world problems in education.

It translates theoretical knowledge into practical solutions, improving teaching, learning, and educational practices.

Applied research has a direct impact on educators, students, and educational institutions, often leading to tangible improvements in the education system.

4.6.0 CHECK YOUR PROGRESS:

1. Define educational research and explain its significance?
2. Differentiate between Fundamental and applied research?
3. How does fundamental research contribute to the theoretical foundation of educational practices?
4. What is the primary purpose of applied research in the context of education?
5. How does applied research benefit teachers and students in real-world educational settings?

4.7.0 SUGGESTED READINGS:

"Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research" by John W. Creswell: This comprehensive book covers various research methodologies, including fundamental research approaches.

"Educational Research: An Introduction" by R. Burke Johnson and Larry Christensen: It provides a solid introduction to the basics of educational research, including fundamental research principles.

"Practical Research: Planning and Design" by Paul D. Leedy and Jeanne Ellis Ormrod: This book focuses on the practical aspects of conducting applied research in education, including designing studies and analyzing data.

"Applied Research Design: A Practical Guide" by Terry E. Hedrick: It offers guidance on designing and conducting applied research studies, with a focus on educational contexts.

General Educational Research:

"Educational Research: Competencies for Analysis and Applications" by Geoffrey E. Mills: This book provides an overview of educational research, including both fundamental and applied aspects.

"Introduction to Educational Research" by Craig A. Mertler: It offers a broad introduction to educational research methods and their applications in both fundamental and applied research.

"The Oxford Handbook of Educational Research" edited by John L. Rury and Patricia G. Weiland: This comprehensive handbook explores various aspects of educational research, offering insights into both fundamental and applied research in education.

ACTION RESEARCH

Structure:

Objectives

Meaning of Action Research

Need of Action Research

Objectives of Action Research

Steps of Action Research

Difference between Fundamental, Applied Research & Action Research

5.1.0 Let's Sum Up

5.2.0 Check Your Progress

5.3.0 Suggested Readings

OBJECTIVES

Students, after reading this topic, will be able to:

- To learn to analyze and assess problems, issues and data critically.
- To gain practical problem-solving skill by actively engaging in research to address real-world issue.
- To learn how to work effectively in teams.
- To develop leadership skills by taking the initiative.

- To become more attuned to ethical considerations in research.

MEANING OF ACTION RESEARCH

Meaning of Research - The research process establishes new truth, finds out new facts, formulation of new theories and suggests to new applications. It is a purposeful activity which contributes to the enhancement of knowledge. According to Random Marey, "Research is systematized efforts to gain new knowledge"

Action research is a systematic and reflective approach to problem-solving and improvement in various fields, particularly in education and social sciences. It involves researchers, often practitioners or educators, actively engaging in the research process to identify, understand, and address specific issues or challenges within their own work or organizational settings. Action research is characterized by its participatory nature, iterative cycles, and the aim of bringing about practical change or improvement.

Action research is a valuable tool in the hands of the teacher to solve day to day problems of class teaching & educational guidance. Action research provides an occasion to the teachers to use the imaginations of children creatively to change classroom practices to meet with needs and demands of pupils adequately and to try out such practices which give greater promises, confidence and worth. Action research develops scientific outlook in the teachers, inspectors, administrators, managements etc of the educational institution the progress in the field of education depends upon the development of scientific outlook in the participants. Action research helps to preserve the democratic values and eliminates and dogmatic practices in the educational institutions. Results obtained by action research are more practical worthwhile from the standpoint of their application and implementation in the field of education. Due to its flexibility it is an ideal instrument for education guidance. Action research can utilize the skills like observing, recording making hypothesis testing them reaching tentative conclusion etc.

Action research is inquiry or research in the context of focused efforts to improve the quality of an organization and its performance. It typically is designed and conducted by practitioners who analyze the data to improve their own practice. Action research can be done by individuals or by teams of colleagues. The team approach is called collaborative inquiry. Action research has the potential to generate genuine and sustained improvements

in schools. It gives educators new opportunities to reflect on and assess their teaching; to explore and test new ideas, methods, and materials; to assess how effective the new approaches were; to share feedback with fellow team members; and to make decisions about which new approaches to include in the team's curriculum, instruction, and assessment plan.

NEED OF ACTION RESEARCH:

Generally in India, a curriculum is set up and given to the teachers to follow in their teaching learning process during a year. This curriculum is based on constant researches and studies going on in the field of education. Such researches are fundamental researches which add to the existing facts in a certain field. The problems related to syllabus, teaching methods, adjustment of students, etc. are few such areas which can be taken up for fundamental researches. But, the minor problems like problems related to discipline or absenteeism or fatigue or boredom related to particular subjects like History, Science or Mathematics which faces by an individual teacher in her classroom cannot be solved by the fundamental research because these problems required immediate solution that can be found by the action research. The researchers say a teacher is an artist to mould his students into the shape he likes. So being an artist it is the utmost duty of the teacher to see and check why he is unable to shape those special category students. The action which a teacher can take up to study the probable causes of an existing problem and thereby providing suggestions to eradicate the problem is called Action Research.

OBJECTIVES OF ACTION RESEARCH:

Action research is conducted with specific objectives in mind, all aimed at addressing practical problems or challenges within a particular context and facilitating meaningful change or improvement. These objectives guide the research process and outcomes. Here's a detailed explanation of the objectives of action research:

- 1. Problem Identification:** One of the primary objectives of action research is to identify and define a practical problem or challenge within a specific context. This involves recognizing issues that may hinder productivity, effectiveness, or overall well-being in a workplace, classroom, community, or organization.

- 2. Understanding the Problem:** Action research aims to gain a deep and comprehensive understanding of the identified problem. Researchers and participants collaborate to explore the root causes, contributing factors, and consequences of the problem. This objective involves examining existing practices, processes, and behaviors to uncover insights into why the problem exists.
- 3. Action Planning:** Action research involves the development of action plans or strategies to address the identified problem. Researchers and participants work together to formulate clear, feasible, and context-specific interventions. The planning phase includes setting objectives, defining roles and responsibilities, and determining the criteria for success.
- 4. Implementation of Interventions:** Another key objective is to implement the planned interventions or changes within the specific context. This may involve adjustments to practices, policies, procedures, teaching methods, or workflows. The goal is to put the proposed solutions into action to test their effectiveness.
- 5. Data Collection:** Action research requires the collection of empirical data to assess the impact of the implemented interventions. Researchers use data collection methods such as surveys, interviews, observations, or document analysis to gather information. The objective is to collect evidence that helps evaluate whether the interventions are producing the desired outcomes.
- 6. Data Analysis and Reflection:** Data analysis is a critical objective of action research. Researchers and participants collaboratively analyze the collected data to determine whether the interventions are effective, and if not, what adjustments may be needed. Reflection on the data and findings is a continuous process, facilitating deeper insights and a better understanding of the problem and potential solutions.
- 7. Iterative Improvement:** Action research follows an iterative cycle where findings and reflections inform further actions and refinements. If the interventions do not produce the desired outcomes, researchers make adjustments and repeat the cycle. This iterative process allows for continuous improvement and adaptation based on ongoing feedback.
- 8. Sharing Knowledge:** Action research seeks to disseminate knowledge and insights gained from the research process. Researchers often share their findings, experiences, and recommendations with colleagues, stakeholders, or the broader community. Sharing

knowledge is essential for creating awareness, promoting change, and inspiring others to apply similar approaches.

9. Sustainable Change: Ultimately, action research aims to achieve sustainable change or improvement within the specific context. The research objectives include not only addressing the immediate problem but also creating lasting solutions and fostering a culture of ongoing improvement.

10. Ethical Considerations: Ensuring ethical conduct throughout the research process is an important objective. Researchers must protect the rights, privacy, and well-being of participants and adhere to ethical guidelines.

In conclusion, the objectives of action research revolve around identifying, understanding, and solving practical problems within specific contexts. This process involves collaboration, data collection and analysis, reflection, iterative improvement, and the dissemination of knowledge. The ultimate goal is to bring about meaningful and sustainable change.

Steps of Action Research

In designing and conducting action research, project the following steps are used.

I. Identification of the problem - A researcher should be serious towards various activities. The problem is isolated from the broad fields. An investigator must realize the seriousness of the problems.

II. Definition and delimitation of the problem - After identifying the problem it should be defined. So the action and goal may be specified. The delimitation means to localize the problem in terms of class, Subject, group and period in which a teacher perceives the problem.

III. Analyzing the Causes of the problem - The causes of the problem are analyzed with the help of some relevance. The nature of causes are also analyzed whether it is the control or beyond the control of the investigator. This helps in formulating the action hypotheses.

IV. Design for the action hypotheses - The design is developed for testing the most important action hypotheses. Some action may be taken and their results are observed. If the hypotheses is

to accepted second design is developed for testing the hypotheses. The design of action research is flexible and can be design a t any time according to the convenience of researcher. Conclusions of Action Research Project - The accepting or rejecting action hypotheses leadsto draw some conclusions. The conclusions are useful in modifying and improving the currentpractices of school and class - room teaching.

Difference between fundamental, applied research and action research:

The main differences between fundamental and applied research lie in their objectives, focus, and outcomes:

Objective:

Fundamental Research: The primary objective of fundamental research is to expand our general understanding of natural phenomena and uncover underlying principles without immediate practical applications in mind. It aims to answer fundamental questions and increase knowledge for the sake of knowledge itself.

Applied Research: The primary objective of applied research is to solve specific practical problems or address real-world challenges. It focuses on developing practical solutions, innovations, or improvements based on the knowledge acquired from fundamental research.

Focus:

Fundamental Research: It explores the theoretical aspects of a subject, seeking to understand the fundamental principles and mechanisms underlying a phenomenon.

Applied Research: It emphasizes the practical application of existing knowledge to address specific problems, improve processes, or create tangible outcomes.

Time frame:

Fundamental Research: It often has a longer timeframe, as it involves exploring new territory, developing theories, and conducting foundational experiments.

Applied Research: It tends to have a shorter time frame, aiming to produce practical results within a more immediate timeline, often focused on specific goals.

Relevance:

Fundamental Research: While essential for advancing knowledge, the immediate practical relevance of fundamental research may not be evident, and its applications may emerge over time.

Applied Research: It has direct relevance to industries, businesses, and societal needs, aiming to create solutions that can be implemented and used in real-world scenarios.

Outcomes:

Fundamental Research: The outcomes are often new theories, principles, or insights that contribute to the broader understanding of a subject.

Applied Research: The outcomes are practical solutions, technologies, products, or methodologies that address specific problems or needs.

Both types of research play crucial roles in the advancement of knowledge and innovation. Fundamental research provides the foundation for applied research, and the two often complement each other in the pursuit of scientific progress and practical solutions. Fundamental Research, Applied Research, and Action Research are distinct types of research with different purposes and approaches:

Fundamental Research: Purpose: Fundamental research, also known as basic or pure research, aims to expand our understanding of fundamental principles, theories, and concepts in a particular field of study.

Focus: It focuses on exploring theoretical and abstract ideas, often without immediate practical applications in mind.

Methods: Researchers in fundamental research typically conduct experiments, gather data, and analyze information to contribute to the existing body of knowledge.

Example: Discovering the structure of DNA or exploring the behavior of subatomic particles in physics are examples of fundamental research.

Applied Research: Purpose: Applied research is designed to solve specific, practical problems or address real-world issues by using existing knowledge and theories.

Focus: It aims to directly apply research findings to practical situations, industries, or technologies.

Methods: Researchers in applied research often work on finding solutions, optimizing processes, or developing products based on existing scientific knowledge.

Example: Developing a new drug based on scientific principles to treat a particular medical condition is an example of applied research.

Action Research: Purpose: Action research is a methodology primarily used in fields such as education and social sciences. Its purpose is to address specific problems or challenges in real-world settings.

Focus: It emphasizes collaboration with stakeholders, often involving practitioners, to bring about positive changes in a particular environment or context.

Methods: Action researchers typically engage in iterative cycles of planning, action, observation, and reflection to identify and implement practical solutions.

Example: A school teacher conducting action research to improve teaching methods in their classroom, involving students and other teachers in the process, is an example of action research.

Fundamental research seeks to advance theoretical knowledge, applied research applies existing knowledge to solve practical problems, and action research is a participatory approach aimed at addressing real-world issues through iterative cycles of research and action. Each type of research serves different purposes and utilizes distinct methodologies.

5.1.0 LET'S SUMUP:

Action research in the educational process is a systematic approach where teachers and educators engage in reflective, practical research to improve teaching methods, curriculum, and student outcomes. It involves cycles of planning, acting, observing, and reflecting, with the aim of addressing specific classroom or school-related challenges and promoting continuous improvement. This approach empowers educators to take an active role in shaping their teaching practices, fostering a culture of learning, and ultimately enhancing the educational experience for students.

Action research plays a pivotal role in the educational process, serving as a dynamic and practical approach to continuous improvement. It empowers educators to take an active stance in addressing challenges within their classrooms and schools, fostering a culture of

self-reflection and adaptability. Action research empowers educators by giving them the tools and methods to drive positive change in their educational environments. It encourages a sense of agency and ownership over teaching practices and student outcomes. Action research often involves collaboration among educators, administrators, and other stakeholders. This collaborative effort fosters a sense of community and shared responsibility for educational success.

5.2.0 CHECK YOUR PROGRESS

1. What is the primary purpose of action research in education?
2. How does action research differ from traditional research in an educational context?
3. Can you describe the typical steps or phases involved in conducting action research?
4. What are some common challenges that educators may encounter when conducting action research?
5. Give an example of a specific educational issue that could benefit from action research?

5.3.0 SUGGESTED READINGS:

"Action Research: Improving Schools and Empowering Educators" by Craig A. Mertler This book provides a comprehensive introduction to action research in education, offering practical guidance and examples.

"The Action Research Guidebook: A Four-Stage Process for Educators and School Teams" by Richard Sagor

A practical guide that outlines a four-stage process for conducting action research in schools, making it accessible for educators.

"Educational Action Research: Becoming Practically Critical" by Stephen Kemmis and Robin McTaggart

This book explores the theoretical underpinnings of action research in education and how it can lead to practical improvements.

"Action Research for Educators" by Sara E. FratEfron and Ruth Ravid

A comprehensive guidebook that covers the fundamentals of action research and its applications in educational settings.

"Participatory Action Research in Education: A Perennial Pathway of Inquiry and Action" by Stephen Preskill and Stephen D. Brookfield

This book discusses the application of participatory action research in educational contexts, emphasizing collaboration and social justice.

"Collaborative Action Research for Professional Learning Communities" by Richard Sagor

Focuses on how action research can be used within professional learning communities to drive improvement in schools.

"Doing Action Research in Your Own Organization" by David Coghlan and Teresa Brannick

While not specific to education, this book provides valuable insights into conducting action research within various organizational settings, which can be applied to educational contexts.

SCIENTIFIC ENQUIRY AND THEORY DEVELOPMENT

Structure:

Objectives

Introduction to Scientific Enquiry

Guiding Principles of Scientific Enquiry

Characteristics of Scientific Enquiry

Concept of Theory Development

Steps of Theory Development

Need

6.2.0 Let'ssum up

6.3.0 Check your Progress

6.4.0 Suggested Readings

OBJECTIVES:

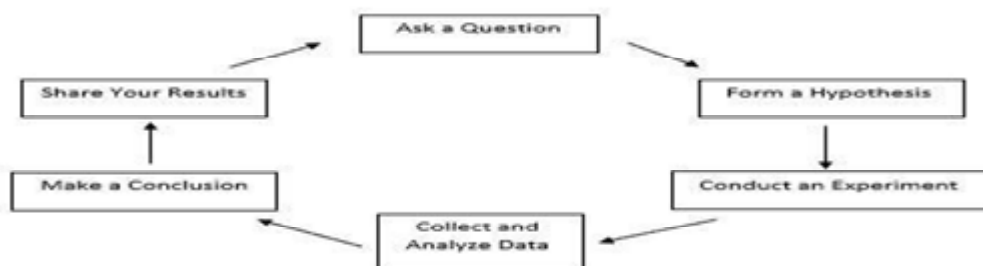
Students, after reading this topic, will be able to:

- ✓ To grasp the fundamental steps to the scientific method.
- ✓ To foster critical thinking skills and ideas.
- ✓ To emphasize the importance of ethical conduct in research.
- ✓ To introduce the concept of theories and their role in understanding and explaining educational phenomena.

INTRODUCTION TO SCIENTIFIC ENQUIRY:

Scientific enquiry in educational research refers to the systematic and methodical approach used to investigate and understand educational phenomena. It involves applying the principles of the scientific method to gather, analyze, and interpret data in an organized and objective manner. It refers to the research and study that scientists carry out. They perform all the research and gather evidence to prove/disprove the theory in question. The results derived from their research are made public so that others can study about that subject and know the things around the world. In scientific enquiry, we make use of the traditional processes. It also refers to the combination of these processes with critical thinking, scientific knowledge, and scientific reasoning, which is then used to develop scientific knowledge. Scientific enquiry uses evidence from observations and investigations to create logical explanations to answer questions related to science. Scientific enquiry is different from the scientific method. The scientific method follows a linear step-by-step process in order to answer a question, while scientific enquiry does not follow a linear step-by-step process. Scientific enquiry helps you think outside the box to understand the natural world. Scientific enquiry can be done by:

- o Engaging in science-oriented questions that challenge thinking
- o Giving priority to evidence when responding to questions
- o Formulating explanations and answering questions from evidence
- o Connecting explanations to scientific knowledge and logic
- o Communicating and justifying explanations.



Diagrammatic representation (Fig. 1.1)

The key components of scientific enquiry in educational research are:

- I. **Observation:** The process begins with carefully observing educational situations, events, or phenomena. Researchers may collect data through various means, such as surveys, interviews, observations, or experiments.
- II. **Research Question or Hypothesis:** Based on their observations, researchers formulate specific research questions or hypotheses. These questions guide the research and provide a clear focus for investigation.
- III. **Data Collection:** Researchers collect relevant data using appropriate methods and tools. This data can be quantitative (numbers and measurements) or qualitative (descriptive and narrative).
- IV. **Data Analysis:** Once data is collected, it is analyzed using statistical, qualitative, or mixed-methods approaches. This analysis helps researchers identify patterns, trends, or relationships within the data.
- V. **Interpretation:** Researchers interpret the analyzed data to draw meaningful conclusions. This involves making sense of the findings in the context of the research questions and existing knowledge.
- VI. **Peer Review:** To ensure the credibility and validity of the research, findings are typically subjected to peer review. Other experts in the field assess the research methods, analysis, and interpretations.
- VII. **Publication and Communication:** Research findings are often published in academic journals or presented at conferences. This dissemination of knowledge allows other researchers and educators to learn from and build upon the research.
- VIII. **Replication:** Scientific enquiry encourages the replication of studies by other researchers. Replication helps confirm the reliability of findings and contributes to the accumulation of evidence on a particular topic.
- IX. **Continuous Iteration:** Scientific enquiry is an iterative process. As new information emerges or additional questions arise, researchers refine their methods and theories to improve understanding.

In educational research, scientific enquiry is essential for several reasons: It ensures that research is conducted in a systematic and rigorous manner.

It allows for the accumulation of evidence-based knowledge, which can inform educational practices and policies.

It helps identify effective teaching methods, interventions, and strategies for improving educational outcomes.

It promotes critical thinking and problem-solving skills among educators and researchers. Scientific enquiry is the foundation of evidence-based decision-making in education, helping to drive improvements in teaching and learning practices.

GUIDING PRINCIPLES OF SCIENTIFIC ENQUIRY:

The principles of scientific inquiry, often referred to as the scientific method, guide the process of conducting scientific research and investigations. These principles are essential for ensuring that scientific studies are systematic, reliable, and capable of producing accurate knowledge. Here are the key principles of scientific inquiry:

Empirical Observation: Scientific inquiry begins with the observation of a phenomenon or a question about the natural world. This observation should be based on evidence that can be perceived through the senses or measured objectively.

Formulating Hypotheses: After making observations, scientists develop hypotheses or educated guesses to explain the observed phenomena. Hypotheses are testable and specific statements that can be supported or refuted through experimentation and data collection.

Designing Experiments: Scientists design controlled experiments to test their hypotheses. In experimental design, variables are manipulated, and the effects of these manipulations are observed and measured. Controls are used to minimize the influence of variables other than the one being tested.

Collecting Data: During experiments, data is collected through careful observations and measurements. This data should be accurate, reliable, and relevant to the research question.

Analyzing Data: Collected data is analyzed to identify patterns, trends, or relationships. Statistical methods are often used to assess the significance of these findings.

Drawing Conclusions: Based on the analysis of data, scientists draw conclusions regarding the validity of their hypotheses. Conclusions should be supported by the evidence gathered during the experiment.

Peer Review: Scientific research is subject to peer review, where other experts in the field evaluate the study's methods, results, and conclusions. Peer review helps ensure the quality and credibility of scientific work.

Reproducibility: Scientific findings should be reproducible by other researchers. This means that the experiment can be repeated by independent investigators, using the same methods, to verify the results.

Openness and Transparency: Scientists are encouraged to be transparent about their methods, data, and findings. This openness allows others to scrutinize and replicate the research.

Revision and Refinement: Scientific knowledge is dynamic and subject to revision as new evidence emerges. Scientists are open to modifying their hypotheses or theories based on new findings.

Ethical Considerations: Ethical principles guide scientific research to ensure the humane treatment of subjects (if applicable), the responsible use of data, and the ethical conduct of experiments.

Communication: Scientists share their findings through publications, presentations, and conferences, contributing to the dissemination of knowledge within the scientific community and society at large.

These principles collectively form the foundation of the scientific method and are integral to the pursuit of accurate and reliable knowledge in various scientific disciplines. They help ensure that scientific inquiry is systematic, objective, and capable of advancing our understanding of the natural world.

CHARACTERISTICS OF SCIENTIFIC ENQUIRY:

Scientific inquiry in the educational process is characterized by several key features that distinguish it from other forms of learning. These characteristics emphasize the importance of critical thinking, exploration, and discovery. Here are the main characteristics of scientific inquiry in education:

Questioning and Curiosity: Scientific inquiry begins with questions and curiosity about the natural world. Students are encouraged to ask "why" and "how" questions, which drive the learning process.

Empirical and Evidence-Based: It is based on empirical evidence and observations. Students learn to gather data through experiments, observations, and measurements rather than relying solely on theoretical or anecdotal information.

Hypothesis Formation: Students formulate hypotheses, which are educated guesses or explanations for observed phenomena. These hypotheses are testable and serve as the starting point for investigations.

Experimental Design: Scientific inquiry involves designing experiments to test hypotheses. Students learn to control variables, develop procedures, and conduct experiments in a systematic and rigorous manner.

Data Collection and Analysis: Students collect and analyze data generated during experiments or observations. They use statistical tools and critical thinking to draw conclusions from the data.

Critical Thinking: Critical thinking skills are central to scientific inquiry. Students evaluate evidence, identify biases, and assess the validity of their findings and the work of others.

Problem-Solving: Scientific inquiry promotes problem-solving skills. Students encounter challenges and obstacles during investigations and must find creative solutions to overcome them.

Collaboration: Collaboration is often encouraged in scientific inquiry. Students work in groups to share ideas, plan experiments, and analyze results, fostering teamwork and communication skills.

Communication: Students are expected to communicate their findings through various

means, such as lab reports, presentations, and discussions. This helps them articulate their ideas and share knowledge.

Reproducibility: Scientific inquiry emphasizes the importance of reproducibility. Results should be replicable by others, reinforcing the reliability of scientific findings.

Open-Mindedness: Students are encouraged to be open-minded and willing to revise their hypotheses or conclusions in light of new evidence. This reflects the dynamic nature of scientific knowledge.

Ethical Awareness: Ethical considerations are integrated into scientific inquiry. Students learn about responsible research practices, including the treatment of subjects, data integrity, and the ethical implications of their work.

Real-World Applications: Scientific inquiry is often connected to real-world applications, demonstrating the relevance of scientific knowledge in solving practical problems and advancing society.

Lifelong Learning: Scientific inquiry instills a lifelong learning mindset, encouraging students to continue asking questions, exploring, and seeking answers throughout their lives.

These characteristics collectively create a structured and rigorous approach to learning that encourages students to actively engage with the natural world, develop critical skills, and contribute to the advancement of scientific knowledge.

Concept of Theory Development:

Theory development in educational research is the process of creating, refining, and articulating theoretical frameworks or models that explain, predict, or guide educational phenomena. The development of theories in educational research is crucial for several reasons:

- o **Understanding Complexity:** Educational settings are often complex, involving various factors, interactions, and variables. Theories help researchers and educators make sense of this complexity by providing a structured framework for organizing and interpreting information.

- o **Predictive Power:** Well-developed theories can make predictions about how certain educational interventions, practices, or policies are likely to impact learning outcomes. This predictive power is valuable for decision-making and planning.
- o **Guiding Research:** Theories provide a roadmap for research by suggesting hypotheses, variables to consider, and relationships to investigate. They guide researchers in designing studies and selecting appropriate methods.
- o **Educational Improvement:** Theories in educational research can inform the development of effective teaching strategies, curriculum design, and educational interventions. They serve as a foundation for evidence-based practices.

STEPS OF THEORY DEVELOPMENT:

The key steps involved in theory development in educational research:

- **Identify a Research Problem:** Theory development begins with identifying a specific educational issue or problem that needs theoretical explanation. This problem often emerges from observations, literature reviews, or practical concerns in education.
- **Literature Review:** Researchers conduct a thorough review of existing literature to understand what is already known about the problem. This helps identify gaps in knowledge and informs the development of a new theory.
- **Conceptual Framework:** Researchers create a conceptual framework that outlines the key concepts, variables, and relationships relevant to the research problem. This framework serves as the initial structure for the theory.
- **Data Collection and Analysis:** Empirical data is collected through research methods such as surveys, experiments, observations, or interviews. Researchers analyze this data to test and refine the conceptual framework.
- **Theory Building:** As data accumulates and is analyzed, researchers modify and expand the conceptual framework to better explain the observed phenomena. This iterative process involves refining the theory based on empirical evidence.

- **Validation:** The developed theory is subjected to further research and testing to validate its validity and applicability across different contexts. Replication studies and additional evidence contribute to theory validation.
- **Communication:** Researchers publish their theories and findings in academic journals, present them at conferences, and share them with the educational community. This dissemination of knowledge encourages discussion and further development.
- **Revision and Integration:** Over time, theories may be revised and integrated with other theories to create more comprehensive frameworks that encompass a broader range of educational phenomena.

Need:

Theory development in educational research is essential for several reasons, as it serves various needs within the field:

Explanation and Understanding: Educational theories provide frameworks for explaining complex educational phenomena, such as learning, teaching, and student development. They help researchers and educators understand why certain practices or processes occur and how they can be improved.

Guidance for Practice: Theories in education offer guidance for educators and practitioners by suggesting effective teaching methods, strategies, and interventions. They provide evidence-based approaches for improving educational outcomes.

Prediction and Control: Well-developed theories enable researchers to make predictions about future educational trends and outcomes. This predictive power allows for proactive decision-making and intervention planning.

Research Design: Theories serve as a foundation for designing research studies. Researchers use existing theories to inform their research questions, hypotheses, and methodologies. This ensures that research is grounded in established knowledge.

Integration of Knowledge: The development of theories helps integrate knowledge from various disciplines and research areas. Educational research often draws on insights from psychology, sociology, neuroscience, and other fields, and theories provide a

framework for synthesizing this information.

Problem Solving: Educational theories provide tools for addressing educational challenges and problems systematically. They offer a basis for problem-solving and decision-making in educational contexts.

Policy Development: Educational theories influence the development of educational policies and practices. Policymakers use theories to inform their decisions about curriculum development, standardized testing, teacher training, and more.

Continuous Improvement: Theories encourage a culture of continuous improvement in education. They serve as a foundation for evaluating and refining educational practices and programs.

Evidence-Based Practice: Theories promote evidence-based practice in education. Educators can use theories to assess the effectiveness of teaching methods and interventions and make informed decisions about their instructional approaches.

Communication and Collaboration: The development and use of theories facilitate communication and collaboration among educators, researchers, and policymakers. They provide a common language and framework for discussing educational issues.

Research Agenda: Theories help shape the research agenda in education. They highlight areas where further research is needed to refine or expand existing theories, addressing gaps in knowledge.

Professional Development: Educators can use theories to inform their own professional development and enhance their teaching practices. Theories provide a basis for reflective teaching and ongoing learning.

Accountability: Theories contribute to accountability in education by providing benchmarks and standards against which educational practices and outcomes can be assessed.

Theory development in educational research is essential for advancing the field, improving educational practice, and ensuring that educational decisions are evidence-based and effective. It provides a structured framework for understanding, analyzing, and addressing the complex challenges and opportunities in education.

Theory development in educational research is an ongoing and dynamic process, essential for advancing the field and improving educational practices. It enables educators and policymakers to make informed decisions based on a solid theoretical foundation. Indeed, scientific inquiry and theory development in educational research are closely intertwined and often go hand in hand. Below is how they are interconnected:

Observation and Problem Identification: Both scientific inquiry and theory development start with the observation of educational phenomena or problems. Researchers identify areas in education that require investigation or theoretical explanation.

Hypothesis or Research Questions: In scientific inquiry, researchers formulate hypotheses or research questions to guide their investigations. These questions often relate to the development or testing of theories. The formulation of these questions is an essential part of both processes.

Data Collection and Theory Testing: Scientific inquiry involves collecting empirical data to test hypotheses or answer research questions. This data can also be used to evaluate and refine existing educational theories or develop new ones. The data collected during inquiry provide evidence for or against theoretical propositions.

Theory Building and Refinement: As data accumulates through scientific inquiry, researchers may find that existing theories need to be refined or that new theories must be developed to better explain observed educational phenomena. In this way, theory development is often an outcome of the data collected during the inquiry.

Interpretation and Conclusion: Scientific inquiry requires the interpretation of data to draw meaningful conclusions. Researchers interpret their findings within the context of existing theories or develop new theoretical frameworks to explain the observed patterns or relationships in the data.

Communication and Dissemination: Researchers communicate their findings and theories through publications and presentations, contributing to the broader educational research community. This dissemination of knowledge facilitates discussion and further refinement of both research methods and theoretical models.

Validation and Further Research: Both theory development and scientific inquiry benefit from validation through replication and additional research. Replication studies confirm the reliability of findings and the robustness of theories.

In essence, scientific inquiry provides the empirical basis for testing, validating, and evolving educational theories. It is through systematic observation and rigorous data collection that theories in educational research gain support and become more refined over time. The iterative nature of these processes ensures that educational research remains dynamic and contributes to the advancement of knowledge in the field.

6.2.0 LET'SSUMUP:

Scientific enquiry and theory development in educational research involve applying rigorous scientific methods to investigate educational phenomena and construct theories that explain and predict these phenomena. Researchers collect data, analyze it, and use the findings to refine or develop theories about how education works. This process helps improve educational practices and policies by providing evidence-based insights. It begins with identifying specific questions or problems within the realm of education that warrant investigation. Researchers aim to formulate clear and precise research questions that are relevant to educational practice and policy. Educational research is often an iterative process. New findings may lead to revisions of existing theories or the development of entirely new ones. This ongoing cycle of research and theory development contributes to the growth of knowledge in the field.

Scientific enquiry and theory development in educational research are essential for enhancing educational outcomes, addressing challenges and adapting to evolving educational landscapes.

6.3.0 CHECKYOURPROGRESS:

1. Define scientific enquiry and how it is applied in educational research?
2. Discuss the process of theory development in the context of educational research?
3. What are the ethical considerations in conducting educational research?
4. How does theory development in educational research evolve over time?

5. What is the significance of employing a scientific approach in educational research?

6.4.0 SUGGESTED READINGS

"Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research" by John W. Creswell and Creswell J. David

"Educational Research: An Introduction" by Meredith D. Gall, Joyce P. Gall, and Walter R. Borg "Educational Psychology: Developing Learners" by Jeanne Ellis Ormrod

"The Sage Handbook of Educational Leadership: Advances in Theory, Research, and Practice" edited by Fenwick W. English and Laura M. Dawson

"Qualitative Inquiry and Research Design: Choosing Among Five Approaches" by John W. Creswell "Educational Theory: An Introduction" by David Turner and Roy Lowe

"Theories in Educational Psychology: Concise Guide" by Patricia Alexander and Richard E. Mayer

"Foundations of Education Research: Understanding Theoretical Components" by Joy Egbert and Sherry L. Carnahan

RESEARCH PROBLEM

STRUCTURE

- 7.1 Introduction
- 7.2 Objectives
- 7.3 Meaning of Research Problem
- 7.4 Selection of Research Problem
- 7.5 Sources of Research Problem
- 7.6 Let us Sum Up
- 7.7 Lesson End Exercise
- 7.8 Suggested Further Readings
- 7.9 Answers to Check Your Progress

7.1 INTRODUCTION

Research is a constant and continuous venture towards the discovery of facts. Before pursuing any discovery a researcher needs to identify the research problem. In fact, the entire process of research is based on the proper identification of the research problem. It is not possible to provide an adequate solution to the problem unless the researcher identifies the problem in correct and precise terms. No, doubt figuring out the research problem takes considerable time and effort. Choosing a problem for research is considered a difficult and technical task on the part of the researcher. It requires a detailed and in-depth review of the related literature to select a problem for study. Basically, the research process is regarded as a cycle that begins with the identification of the problem

and ends on the solution of the problem.

7.2 OBJECTIVES

After reading this lesson, you shall be able to:

- define research problem
- identify the important points for the selection of the research problem
- describe the important sources for the selection or identification of research problem

7.3 MEANING RESEARCH PROBLEM

Research problem is a specific and well-defined issue or question that a researcher seeks to investigate through research. It is the starting point of any research project, as it sets the direction, scope, and purpose of the study. So, the issue or topic that a researcher wants to explore through research is known as a research problem. It is the focus or reason for engaging in research work. Any research work must begin here because it establishes the investigation's path, parameters, and goals.

John W. Creswell: "Research problem is an educational issue, controversy, or concern that guides the need for conducting a study."

Kerlinger: "Research problem is an interrogative sentence or statement that asks what relation exists between two or more variable. The answer to question will provide what is having sought in the research."

R. A. Woodworth: "Research problem is a situation for which we have no ready and successful response by instinct or by previous acquired habit. We must find out what to do i.e. a solution can be found out only after an investigation."

F.J. McGuigan : "A solvable problem is one that possesses a question that can be answered with the use of man's normal capacities."

C.R. Kothari: "The problem felt by the researcher in relation to the theoretical or practical aspect for which he desired to have a solution is called a research problem."

Thus, specifying a research problem in a study is important because it sets the stage for the entire study. Without knowing the research problem, readers do not know why the study

is important and why they should read the study. Basically, research problem is the topic a researcher would like to address, investigate, or study, whether descriptively or experimentally.

7.4 SELECTION OF RESEARCH PROBLEM

Just because a problem exists and an author can clearly identify the issue does not mean that the researcher can or should investigate it. The research problem undertaken for study must be carefully selected. Following points may be taken into account by a researcher while selecting a research problem for conducting research.

- 1. Personal interest:** Research process requires a lot of hard work and is usually time-consuming. The personal interest of the researcher in the area of research helps in sustaining necessary levels of perseverance and motivation during the course of research.
- 2. Availability of resources:** Availability of resources is a major factor in research. A research problem should be selected keeping in view the resources available. Resources like money, time, accommodation, a well-equipped library and laboratory, transportation etc. should be taken into consideration while selecting a research problem.
- 3. Data availability:** Researcher should make sure that the data pertaining to a research problem is available. It is important to ensure that the related literature like journals, reports or any other kind of desired data is available before finalizing the topic.
- 4. Relative importance and relevance:** The importance or significance of the problem plays a vital role in the selection of research problem. The outcome of the research should be useful for the society. It should make a significant contribution to the concerned body of knowledge or to the solution of some existing problems. It should be socially relevant.
- 5. Expertise:** The researcher should have necessary knowledge for conducting research. The wisdom and experience of the researcher play a very important role in collecting and analyzing data. A researcher must possess adequate knowledge of the subject-matter, research methodology and statistical procedures.
- 6. Ethical issue:** Researcher should also consider some ethical issues while selecting

a research problem. Certain ethical issues like privacy of subjects, security, confidentiality, informed consent, potential for harm etc. should be adhered to ensure voluntary, informed and safe participation of subjects in research process.

7. **Time-lines of the problem:** Some problems take little time for its solution while others take more time. Researcher is required to set a clear-cut timeline. It helps the researcher to set clear priorities and directions so that the various aspects of the research problem are completed in time.
8. **Researchability of the problem:** The problem should be researchable through scientific investigation. Problems should involve variables which can be precisely defined and measured.

7.5 SOURCES OF RESEARCH PROBLEMS

The choice of a suitable problem is always a difficult task on the part of the researcher. It is very important to identify a research problem that is relevant, original, unique and feasible; moreover that does not simply duplicate the work of others. So, how do you find a good research problem? The following discussion will help you to discover and refine your research problem:

1. **Review of Related Literature.** Review of related literature is one of the main sources of research problem. It provides the much needed information to determine what has already been studied in relation to the problem that is to be investigated. It includes journals and periodicals, books, magazines and newspapers, e-Sources, dissertations, doctoral theses, conference proceedings and papers, monographs and many more. After going through the related literature, the investigator can identify the problems or variables related to that aspect where no research has been conducted till date. It is well said that the data collected from relevant literature is quite significant because it helps to:
 - Fill existing gaps in knowledge based on a specific research.
 - Determine if current studies can have implications on further research on the same issue.
 - Explore the possibility to conduct a similar study in a different area or apply the same in a different context.

- Determine if the methods used in previous studies can be effective in solving future problems.

A vast literature is available which can be searched electronically or manually to identify a research problem. It is a common observation that searching an online database is far more easy and efficient than searching stacks of journals in the library.

2. **Personal experiences:** Everyday experiences of the researcher are a good source of research problem. A researcher has to think critically about his/her personal experiences with an issue that has an effect on his/her family, personal life, or community at large. A research problem derived from personal experiences can spring from any issue and from anywhere. For example, you can construct a research problem from events that appear to be out of the ordinary or from community relationships that don't have clear explanations.
3. **Professional experience:** Another important source of identifying a research problem is the professional experience of a researcher. For example, if researcher is a teacher, counsellor or administrator or working in any organisation, he or she must be confronted with a number of problems in his/her day-to-day academic and non-academic activities. Classroom interaction between teacher and taught, between learners themselves, and between learners and learning materials may provide a variety of problems to be solved through research. Teachers confront a number of behavioural problems in and outside the classroom to take up as research problems. Observation of learner behaviour in terms of academic achievement, interests, attitudes, intelligence, mental health and hygiene, adjustment, motivation, values, personality traits etc. inspire the researcher to conduct research to improve the teaching-learning process. The researcher may wish to get answers to certain important and significant questions pertaining to certain components of the teaching-learning process. What are the effective methods of teaching? How are learning materials presented? How to help the students to manage stress? What are the ways and means to enhance learner's motivation? How different modes and styles of teaching affect student learning?
4. **Interdisciplinary perspectives:** The word interdisciplinary refers to the involvement of more than one discipline, which is defined as a field of study or a

branch of knowledge. Identifying a problem that forms the basis for a research study can come from outside the primary area of study. A review of pertinent literature from related disciplines can expose the researcher to new avenues of exploration and analysis. An interdisciplinary approach to select a research problem offers an opportunity to construct a more comprehensive understanding of a very complex issue than any single discipline might provide. This approach helps the researcher to develop a comprehensive understanding while selecting a problem for investigation. By incorporating different viewpoints from various branches of knowledge, a researcher can create new perspectives or even new dimensions of knowledge not yet considered.

5. **Technological and social changes:** The new innovations and technological changes are constantly paving the way for new problems and new opportunities for educational research. Innovations like Smart Classrooms, MOOCs, Online Learning, e-Learning, Blended Learning, Learning Management System or use of Artificial Intelligence and other hardware and software techniques need to be carefully evaluated through the research process. Significant elements, such as finance, legal issues, scaffolding, learner connection, and alignment with learning aims, all serve as a source for selecting a research problem. We have already noticed that the COVID-19 outbreak affected teaching-learning opportunities in all respects. Much of the curriculum has been adapted to an online format, the long-term consequences of which are yet to be recognized. The shift has impacted both teachers and learners to a great extent. A systematic approach is required to study this impact of online teaching on learning outcomes, in comparison to the previous format, where, in person education may have been the focus.
6. **Discussion with the supervisor:** The most practical source for the identification of the research problem is the consultation with the course instructor or research supervisor. Supervisor is regarded as the most expert and experienced person of the field. The supervisor can discuss certain issues of the area to emerge a problem. He can direct the researcher to proceed along proper lines, wherever necessary. He can guide the students to select appropriate projects and must encourage the students to aim at completion. He is expected to be in a better position to help the students clarifying their thinking, achieving a sense of focus and developing a

manageable problem in precise manner.

7. **Theory-based research:** Different theories advocated by psychologists, sociologists, anthropologists, economists etc. serve as a source of identifying the research problems. For example, the application of general principles involved in various theories of learning makes an excellent starting point for research in this area. Various theories of personality, intelligence, motivation, etc. are helpful in identifying problems pertaining to classroom situations and practices. Researchers can successfully test the validity, scope, and classroom implications of various theories in educational situations. Sometimes research is conducted to clarify various theoretical issues.
8. **Seminars and conferences:** Seminars and conferences organised at state, national or international level in different subject areas also serve as a rich source of selecting research problem. In these seminars and conferences, the researchers present their papers related to the theme and sub-themes of the seminar or conference. It provides valuable exposure to the researcher to learn about cutting edge research, meet new people, and build strong professional relationships with the people already engaged in the process of research. One may get interested in idea presented through the paper and think of conducting research.

Check Your Progress-1

Note: (a) Write your answers in the space given below.

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. Fill in the blanks
 - (i) Research problem is a _____ that asks what relation exists between two or more variable.
 - (ii) Research problem is a specific and well-defined issue or question that a researcher seeks to _____ through research.
 - (iii) Research problem is a _____ for which we have no ready and successful response by instinct or by previous acquired habit.

- (iv) Availability of _____ is a major factor in research.
- (v) Professional experience of a _____ is an important source of identifying a research problem.

2. Define the term Research Problem

3. Illustrate the points to be kept in mind while selecting a Research Problem.

4. Mention the major sources of Research Problem

7.6 LET US SUM UP

One of the most challenging aspects of conducting research is to clearly identify the problem that leads to a need for conducting study. Individuals do not seem to give enough attention to why they are conducting their studies. Educational research is done to bring better solutions in the field of education. It aims to provide better teaching and learning techniques which will help in the overall development of children. Research is essential to give the best education to children. It provides them with useful and reliable knowledge and facts making education more effective. Thus, research problem is one requires a researcher to find out the best solution for the given problem that is to find out by which course of action the objective can be attained optimally in the context of a given environment.

7.7 LESSON END EXERCISE

- 1. Discuss the concept Research Problem.
- 2. Elaborate the various points related to the selection of a research problem.
- 3. Illustrate the major sources of Research Problem.

7.8 SUGGESTED READINGS

1. Freedman, P. (1960): Principles of Scientific Research. New York: Public Affairs Press.
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7.9 ANSWERS TO CHECK YOUR PROGRESS

- (i) statement
- (ii) investigate
- (iii) situation
- (iv) resources
- (v) researcher

EVALUATION OF RESEARCH PROBLEM

STRUCTURE

- 8.1 Introduction
- 8.2 Objectives
- 8.3 Criteria for Research Problem
- 8.4 Delineating Variables
- 8.5 Operationalizing Variables
- 8.6 Let us Sum Up
- 8.7 Lesson End Exercise
- 8.8 Suggested Further Readings
- 8.9 Answers to Check Your Progress

8.1 INTRODUCTION

Researchers begin a study by identifying a research problem that they need to address. Before designing and writing about the problem, researchers need to consider whether it can and should be studied. The researcher must have access to people and sites and possess the time, resources, and skills to study the problem. The study needs to contribute to knowledge and practice. There also needs to be a match between the research problem and the approach-quantitative or qualitative-chosen for the study. Research is more than compiling, counting and tabulating data. It involves deducing the consequences of hypothesis through careful observation and the application of rigorous logic. It is a

serious responsibility to commit oneself to a problem that will inevitably require much time and energy and that is so academically significant.

8.2 OBJECTIVES

After reading this lesson, you shall be able to:

- explain the criteria for evaluation of research problem
- delineate variables
- operationalize variables

8.3 CRITERIA FOR EVALUATION OF RESEARCH PROBLEM

Evaluation of the problem is very essential after choosing the research topic. Evaluation will help in doing systematic and organized research. Individuals do not seem to give enough attention to why they are conducting their studies. Just because a problem exists and an author can clearly identify the issue does not mean that the researcher can or should investigate it. A research problem should be easily achieved, solved, or answered by the researcher after all valid procedures had been carried out. However, following points lay criteria for the evaluation of the research problem:

1. Problem should be researchable

It must be ensured that the problem is researchable. There are certain problems that cannot be effectively solved through the process of research. A researchable problem is always concerned with the relationship existing between two or more variables that can be defined and measured. The problem should be capable of being stated in the form of workable research questions that can be answered empirically

2. Problem should be novel and original

There is no use in studying a problem which has already been adequately investigated by other researchers. To avoid such duplication, it is essential to examine very carefully the literature available in the field concerned. The problem should be selected only when the researcher is convinced that it is really a new problem

which has never before been investigated successfully. However, it must be noted that a researcher may repeat a study when he/she wants to verify its conclusions or to extend the validity of its findings in a situation entirely different from the previous one.

3. Problem should be significant

The problem should attempt to fill the gaps in the existing field of knowledge. It should strive to solve some of the inconsistencies in the previous research, or to help in the interpretation of the known facts. The results or findings of a study should either become a basis for a theory, generalizations or principles. Besides, they should lead to new problems for further research or have some useful practical applications.

4. Problem should be attainable within the budget and time frame

Ensure that the research activity is attainable within the budget and time frame. Researchers need to consider the logistical factors to ensure successful completion of research. Losing out on the research due to the lack of money and manpower to complete it within a specified timeframe will be a sheer waste of time. So, researchers should consider the time allotment for their research and should think of a research problem that could be carried out in the given time period. Moreover, researchers need to create a budget and obtain advice from other, experienced researchers about whether the anticipated expenses are realistic. Keeping in view the various resource requirements, investigators need to limit the scope of research.

5. Problem should be measurable

The research problem should be quantifiable or observable. This may include interviews, surveys, questionnaires or recorded observations such as videos and audio recordings. Researchers are required to think about the instruments that will help them to collect data from their respondents. There is a need to explore the possibility to perform the experimentations or observations needed to solve their problems. After identifying a research problem, researchers should also consider if it better fits a quantitative or qualitative approach. Because the two approaches differ in their essential characteristics, there should be a match between problem

identified and the approach adopted for the investigation.

6. Problem should be feasible for the particular researcher

Pursue only the problems that are feasible. Otherwise, a problem may be researchable, new or significant, and yet not feasible because of the following considerations:

- a) Competency of the researcher: The problem should be in an area in which the researcher is qualified and competent. He/she must possess the necessary skills and competencies that may be needed to develop and administer the data gathering tools, and interpret the data available for analysis.
- b) Knowledge of research methodology: The researcher should also have the necessary knowledge of research design, qualitative and quantitative techniques of data analysis etc. that may be required to carry out the research to its completion.
- c) Interest and enthusiasm: The researcher should be genuinely interested in and enthusiastic about the problem he/she wants to undertake for research.
- d) Financial considerations and feasibility: The researcher should ascertain whether he/she has the necessary financial and temporal resources to carry on the study. It is important to estimate the cost of the project and assess the availability of funds. This will determine whether the project can be actually executed.
- e) Administrative considerations: The researcher should also consider the nature of data, equipment, specialised personnel, and administrative facilities that are needed to complete the study successfully. He/she should check whether he/she is able to get the cooperation from various administrative authorities for collecting various types of data.
- f) Time: It is important to assess the time required to complete a study. Besides the assessment of total period, it is necessary to identify the period of the year in relation to the nature of the study.
- g) Riskmanagement: The ability of the researcher to identify and manage all possible risks that may be involved in the research is a very crucial factor. Special risks, threats and handicaps or cost of physical, financial, personal, social or professional

character may arise any time that may have a negative impact on the research.

8.4 DELINEATING OF VARIABLES

A variable is a characteristic or attribute of an individual or an organization that researchers can measure or observe and can vary among individuals or assume different values or scores for different individuals. They are key ideas that researchers seek to collect information on to address the purpose of their study.

Creswell (2012) defines characteristics of individuals as personal aspects about them, such as their grade level, age, or income level. An attribute, however, represents how an individual or individuals in an organization feel, behave, or think. For example, individuals have self-esteem, engage in smoking, or display the leadership behaviour of being well organized. A researcher can measure these attributes in a study.

Next, consider what it means to "measure" these attributes or characteristics. Measurement means that the researcher records information from individuals in one of two ways:

- Asking them to answer questions on a questionnaire (e.g., a student completes questions on a survey asking about self-esteem)
- Observing an individual and recording scores on a log or checklist (e.g., a researcher watches a student playing basketball and records scores on dribbling techniques) In either case, student scores will probably vary (hence the name variable). When variables vary, it means that scores will assume different values depending on the type of variable being measured. For example,
- Gender varies by two possible scores: female= 2 and male =1.
- Self-esteem varies by three possible scores: High= 3, average= 2, and negative= 1

Thus, delineating of variables is considered a very important practice in research process. Delineation means description, explanation, demarcation or outlining. To carry out a study, it becomes imperative to delineate the variables. Delineation of variables in a study requires learning the definition of each type of variable and understanding its role in providing direction for a study. Different types of variables incorporated into quantitative purpose statements, research questions, and hypotheses are discussed as under:

Independent Variables

An independent variable is an attribute or characteristic that influences or affects an outcome or dependent variable. In research studies, the independent variables are also called as factors, treatments, predictors, determinants, or antecedent variables. Researchers study independent variables to see what effect or influence they have on the outcome. For example, consider this research question:

Do students who spend more instructional time in class have higher academic achievement than students who spend less time? In this example, independent variable is instructional time in class and dependent variable is academic achievement

Dependent variable

A dependent variable is an attribute or characteristic that is dependent on or influenced by the independent variable. These variables are labeled in the literature as the outcome, effect, criterion, or consequence variables. Researchers typically investigate multiple dependent variables in a single study, although in many studies, one of the dependent variables is typically of central interest. Dependent variables can be measured using continuous or categorical scores.

For example, a study aims to investigate how study hours correlates with test scores. The independent variable is the number of study hours each student devotes and dependent variable refers to the test scores because this is dependent on the number of study hours devoted.

Moderating Variables

A moderating variable affects the relationship between a dependent variable and an independent variable. Moderating variables are selected by the researcher in a study to determine the joint impact of both independent and moderating variables on dependent variable. This impact is called an interaction effect. A moderating variable can be illustrated in this quantitative hypothesis:

For example, a study aims to investigate how working hours affect job satisfaction at workplace. The independent variable is the number of working hours at workplace each and dependent variable is the job satisfaction because this is dependent on the number of

working hours devoted at workplace. However, this relationship between working hours and job satisfaction at workplace could be affected by a moderating variable such as gender.

Intervening Variable

An intervening variable is an attribute or characteristic that "stands between" the independent and dependent variables and exercises an influence on the dependent variable apart from the independent variable. Intervening variables transmit (or mediate) the effects of the independent variable on the dependent variable.

Thus, they are also called mediating variables. In some quantitative studies, intervening variables are controlled using statistical procedures.

Confounding variables

Confounding variables are extraneous variables whose presence affects both the independent and dependent variables. The researcher cannot directly measure these variables because their effects cannot be easily separated from those of other variables, even though they may influence the relationship between the independent and the dependent variable.

For example, a study aims to determine the effect of study hours on exam scores may not take into account the past knowledge of the participants on the subject. In this case, previous knowledge serves as a confounding variable, as it can influence the both i.e. the amount of time devoted studying and exam scores achieved.

8.5 OPERATIONALIZING VARIABLES

Operationalization of variables in research is the process defining variables into measurable factors. Operationalizing a variable means finding a measurable, quantifiable, and valid index for variables (independent and dependent variables) under investigation.

Such variables as creativity, intelligence, giftedness, motivation, learning, academic achievement, stress and like are conceptualizations that are defined in dictionary terms. These variables cannot be observed directly. Vague and ambiguous definitions provide a poor basis for identifying variables. Much more precise and unambiguous definitions of variables can be stated in operational form, which stipulates the operation by which they

can be observed and measured. The operational definition of the variable clearly reflects what the researcher intends to measure and how to measure.

In stating a problem, the researcher should make sure that it is neither stated in terms so general as to make it vague nor specified so narrowly as to make it insignificant and trivial.

The most important step in this direction is to specify the variables involved in the problem and define them in operational terms.

For example, a researcher wants to study the "Effect of Emotional Intelligence on Adjustment of Student-teachers". This statement is broad and it communicates in a general way what you want to do. But it is necessary to specify the problem with much greater precision.

For this the first step is to specify the variables involved in the problem and define them in operational terms.

The variables involved in the problem are, "Emotional Intelligence" and "Adjustment". It is to be noted that these expressions are to be understood beyond their dictionary meanings. For example, the dictionary meaning of "Emotional Intelligence" is "the ability to understand your emotions and those of other people and to behave appropriately in different situations". This meaning is quite general not sufficient for research purposes. It is important for a researcher to specify exactly what indicator of emotional intelligence, a researcher will use or what he will do to measure the presence or absence of the factors of emotional intelligence. Researcher is required to define the term operationally as "emotional intelligence skills in the present study are measured through 10 factors - self-awareness, empathy, self-motivation, emotional stability, managing relation, integrity, self-development, value orientation, commitment and altruistic behaviour on Emotional Intelligence Scale by Hyde, Pethe and Dhar." Similarly, the researcher has to define the other variable "Adjustment" in terms of the operations or processes that will be used to measure it as "adjustment in the present investigation is an aggregate score of five separate measures of adjustment (home, health, social, emotional and school/college adjustment) as measured by Saxena Adjustment Inventory by M.S.L. Saxena."

Similarly, the term student-teacher can also be defined operationally as, "Student-teacher

means a pre-service college student who is teaching under the supervision of a teacher-educator in order to qualify for the degree of bachelor of education. Thus, in the present investigation the term student-teachers means the teacher-trainees pursuing B.Ed. course in a college of education to acquire skills and competence in teaching."

Check Your Progress-1

Note: (a) Write your answers in the space given below.

(b) Compare your answers with those given at the end of the lesson/above subsection.

1. Fill in the blanks

(i) _____ of the problem is very essential after choosing the research topic.

(ii) The problem should attempt to fill the _____ in the existing field of knowledge.

(iii) An independent variable is an attribute or characteristic that influences or affects _____.

(iv) An _____ is an attribute or characteristic that "stands between" the independent and dependent variables.

(v) Operationalization of variables in research is the process of _____ variables into measurable factors.

2. Mention the criteria for the evaluation of a research problem.

3. Explain the significance of delineation of variables in a research study.

4. How operationalization of variables is important in a research study?

8.6 LET US SUM UP

Evaluation of the problem is very essential for systematic and organized research. Researchers are required to evaluate the problem in the light of researchability, originality, significance, budgetary requirements, feasibility of the problem, suitability of the researcher, necessary competence to plan and carry out research, ability to interpret the findings, knowledge of statistical techniques, accessibility of potential data, validity and reliability of data collection tools etc. Solution of the problem can be easily achieved, solved, or answered by the researcher if valid procedure is carried out. A detailed knowledge of the research studies conducted in the field helps the researcher to get an idea about the relevance of the problem. Delineating and operationalizing variables after the adequate selection and evaluation of the problem is equally important.

8.7 LESSON END EXERCISE

1. Discuss the criteria for the evaluation of a Research Problem.
2. Elaborate delineation of variables in a research study.
3. Describe operationalization of variables in a research study.

8.8 SUGGESTED READINGS

1. Freedman, P. (1960): Principles of Scientific Research. New York: Public Affairs Press.
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8.9 ANSWERS TO CHECK YOUR PROGRESS

- (i) evaluation
- (ii) gaps
- (iii) dependent variable
- (iv) intervening variable
- (v) defining

REVIEW OF RELATED LITERATURE

STRUCTURE

- 9.1 Introduction
- 9.2 Objectives
- 9.3 Meaning of Review of related Literature
- 9.4 Importance of Review of related Literature
- 9.5 Let us Sum Up
- 9.6 Lesson End Exercise
- 9.7 Suggested Further Readings
- 9.8 Answers to Check Your Progress

9.1 INTRODUCTION

Humans have the advantage to utilize knowledge which has been preserved or accumulated over the years. This acquired knowledge pertaining to different fields when organized and written down- is counted as Literature. Thus, literature in research is a collective body of works done by earlier researchers and published through online or offline mode in the form of books, articles, research papers, dissertations, doctoral theses, monograph etc. Every scientific investigation starts with a Review of Literature. The researcher must be thoroughly familiar with both previous theory and research. In fact, working with the searching and reviewing literature constitutes an essential part of the research process.

9.2 OBJECTIVES

After reading this lesson, you shall be able to:

- explain the meaning of Review of related Literature.
- describe the Importance of Review of related Literature.

9.3 MEANING OF OF REVIEW OF RELATED LITERATURE

The phrase Review of Related Literature is a combination of three words-Review, Related and Literature. The word literature in research methodology means journals, statistical record, encyclopaedias, books, magazines, conference proceedings, reviews, abstracts, dissertations, theses etc. and related means pertaining to area of research. Thus, related literature refers to the body of knowledge of a particular area of investigation in any discipline which includes books, journals, periodicals and other forms of research studies. The term review means to examine and organize the existing knowledge of a particular area of study in context with the present investigation to ensure that the proposed study would be an addition to the field. In other words, review of literature is a written summary of journal articles, books, and other documents that describes the past and current state of information on the topic of research study.

Mangal and Mangal (2013) defined review of literature as " a deliberate attempt on the part of the researcher to examine and review all types of available relevant information for finding out what has already been done or not done so far on the topic of his research."

Thus, review of literature is a piece of academic writing demonstrating knowledge and understanding of the academic literature on a specific topic placed in context. It is a summary of the published work in a field of study. Literature review reflects that the researcher has examined the breadth of knowledge and can justify his/her research.

A literature review has four main objectives:

- It surveys the literature in your chosen area of study
- It synthesises the information in that literature into a summary
- It critically analyses the information gathered by identifying gaps in current

knowledge; by showing limitations of theories and points of view; and by formulating areas for further research and reviewing areas of controversy

- It presents the literature in an organised way A literature review shows your readers that you have an in-depth grasp of your subject; and that you understand where your own research fits into and adds to an existing body of agreed knowledge.

It helps to generate ideas, developing significant questions and finding research gaps. It help researcher in selection of good and pinpointed research problems, selection of variables, writing objectives and hypotheses, delimiting study, selection of research method, selection of sample and sampling techniques, selection of tools, collection of data, scoring, statistical analysis, presentations of results, discussion and prediction. It updates knowledge of researcher, avoid the replication and save money, time and energy of researcher.

9.4 IMPORTANCE OF REVIEW OF RELATED LITERATURE

The basic purpose of review of literature is to examine, summarize and synthesize the findings and ideas of existing knowledge in a particular field without adding any new contributions. Thus review of literature includes systematic identification and analysing of related information to the research area. Familiarity with earlier research helps the researcher to frame the research questions and research hypotheses that provide future directions for the investigator. The importance of the term review of related literature can be justified through following statements of eminent authors:

According to Good, Barr and Scates, "The competent physician must keep abreast of the latest discoveries in the field of medicine. Obviously the careful student of education, the research worker and investigator should become familiar with location and use of sources of educational information"

According to W. R. Borg, "The literature in any field forms the foundation upon which all future work will be built. If we fail to build the foundation of knowledge which is provided by the review of literature our work is likely to be shallow and naïve and will often duplicate work that has already been done better by someone else."

According to John W. Best, "Practically all human knowledge can be found in books and libraries. Unlike other animals that must start a new with each generation man builds upon the accumulated and recorded knowledge of the past. His constant adding to

the vast store of knowledge makes possible progress in all the areas of human endeavour."

According to Carter V. Good, "The keys to vast storehouse of published literature may open doors to sources of significant problems and explanatory hypothesis and provide helpful orientation for definition of the problem, background for selection of procedure and comparative data so interpretation of results."

On the basis of above discussion, the importance of review of related literature is as follows:

- 1. Focusing on research problems:** Review of literature is helpful in examining different aspects of a research problem that have been reported by other researchers. After the careful examination of various aspects of the research problem, the investigator can identify the focus area of research and research gaps which are essential to a present study. Through this process of winnowing, the researcher will be able to place the relevance of his/her research in the larger context of what other researchers have already done on the related area in the past. Thus, review of literature helps the researcher to evaluate, condense and synthesize gist in his own words to sharpen the research focus.
- 2. Finding research gaps:** Review of literature is quite helpful in finding out the research gaps in earlier researches. The research gaps scrutinized initially are further explored to establish the latest facts of theories to add value to the field. Apart from maintaining continuity of knowledge, it exposes the areas that require further investigation and thus aid as a starting point of any future research. A careful synthesis of the past researches helps a researcher to identify the significant overlaps and gaps among the prior works. Moreover, the final suggestions and conclusions of the previous research will become the guiding resources for the present work.
- 3. Adopting appropriate methodology:** Review of literature provides an opportunity to the researcher to acquaint himself with the various methodologies which have been used by others in their field of investigation. The review of existing research also helps the investigator to select a better methodology in the light of challenges and problems faced by other researchers after adopting the particular methodology. Thus, researcher can adopt a more appropriate methodology for the research by

examining the strengths and weaknesses of existing research. Moreover, review increases the significance of the results by comparing it with the existing literature.

4. **Avoiding duplication of well-established findings:** A proper review of the literature helps in avoiding duplication or replication of work which has established with relevant data and facts. A careful review helps the researcher in getting acquainted with the number and nature of the studies related to the present research whose validity is being assessed at present. This, in turn, will help the researcher in building a better perspective for future research.
5. **To contextualize research findings:** Review of related literature enables the researcher to compare findings of the present research with other studies in the field. It provides an opportunity to show the originality and uniqueness of the research in the light of existing researches in the same field. It helps in establishing the consistency in knowledge and ultimately will lead to the increase of its trustworthiness with the readers.
6. **Identifying variables relevant for research:** A careful review of the literature makes the researcher aware about various relevant and irrelevant variables in the concerned area of research. It further helps the researcher in selecting, defining and operationalising variables which are conceptually and practically important within the scope of his study. Thus, review of literature, on the whole, enables the researcher to formulate a research problem by selecting conceptually and operationally important variables for the study under investigation.
7. **Avoiding incidental plagiarism:** Research basically attempts to answer certain questions which have not been answered so far. Conducting the research without reviewing the related literature may have serious consequences. For example, let us imagine that a researcher conducts a study without reviewing the related literature and before publication comes to know that the work has already been done and published on the same topic by another researcher. Of course, the researcher has not plagiarized anything deliberately from that study but people will become suspicious and raise question mark on the study. At the end of the day, the whole exercise will become a futile activity as there is no significance of repeating similar research. It will lead to the sheer wastage of time, energy, money, and other

resources on the part of the researcher. Thus, review of related literature can help the researcher to avoid such mishaps.

Thus, it can be concluded that review of related literature is one of the important aspects of research process which provides basis for research work and guides towards the solution of the problem.

Check Your Progress-1

Note: (a) Write your answers in the space given below.

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. Fill in the blanks

(i) Acquired knowledge pertaining to different fields when organized and written down is counted as _____.

(ii) _____ refers to the body of knowledge of a particular area of investigation in any discipline.

(iii) Review of literature is helpful in _____ different aspects of a research problem.

(iv) Review of literature is quite helpful in finding out the _____ in earlier researches.

(v) A proper review of the literature helps in avoiding _____ of work.

2. Define the term Review of literature.

3. Enlist the importance of Review of literature.

4. Explain the term plagiarism.
-
-

9.5 LET US SUM UP

Reviewing the literature includes identification of all relevant published material in the problem area and reading that part of it with which the researcher is not familiar. It helps the researcher to evaluate the research problem to get an idea that how the present research is different or original from what others have done. It helps in rationalizing the need for conducting the particular research in a specified field. The importance of literature review in research can be condensed into an analytical feature to enable the multifold reach of its significance. It adds value to the legitimacy of the research in many ways. It helps in justifying the research. It is important to know what has been already established, discredited and accepted in the particular field of research. It establishes the background in the field for the researcher and provides the reader a summary of the thinking and research necessary for them to understand study. A profound literature review with many relevant sources of reference enhances the credibility of the research.

9.6 LESSON END EXERCISE

1. Discuss the concept Review of literature.
2. Describe the importance of Review of literature.

9.7 SUGGESTED READINGS

1. Freedman, P. (1960): Principles of Scientific Research. New York: Public Affairs Press.
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9.8 ANSWERS TO CHECK YOUR PROGRESS

- (i) literature
- (ii) related literature
- (iii) examining
- (iv) research gaps
- (v) duplication or replication

HYPOTHESIS

STRUCTURE

- 10.1 Introduction
- 10.2 Objectives
- 10.3 Meaning of Hypothesis
- 10.4 Sources of Hypothesis
- 10.5 Types of Hypothesis
- 10.6 Characteristics of a good Hypothesis
- 10.7 Importance of Hypothesis
- 10.8 Difference between Assumption and Hypothesis
- 10.9 Let us Sum Up
- 10.10 Lesson End Exercise
- 10.11 Suggested Further Readings
- 10.12 Answers to Check Your Progress

10.1 INTRODUCTION

The process of research begins with the selection of a suitable problem from a particular field of study. The search for finding the solution of the problem starts with a set of speculations, suppositions, and guesses to arrive at some valid conclusions. This tentative

solution offered to the problem in the form of a testable preposition is called as hypothesis. It is usually considered as the practical principal instrument in research. In fact, many researches are conducted with the deliberate objective of testing hypothesis. The sole purpose of a hypothesis is to make prediction about the findings, and conclusions of the study. It comes from a place of curiosity and intuition.

10.2 OBJECTIVES

After reading this lesson, you shall be able to:

- explain the meaning of Hypothesis.
- identify the major sources of Hypothesis.
- describe the types of Hypothesis.
- elaborate the characteristics of a good Hypothesis.
- enumerate the importance of Hypothesis
- differentiate between Assumption and Hypothesis

10.3 MEANING OF HYPOTHESIS

Etymologically the word 'hypothesis' is derived from two Greek words-hypo and thesis. 'Hypo' means tentative or subject to the verification and 'thesis' means statement about solution of a problem. Thus, the term hypothesis means is a tentative statement about the solution of the problem'. Hypothesis offers a solution of the problem that is to be verified empirically and based on some rationale.

Another meaning of the word hypothesis which is composed of two words: 'Hypo' means composition of two or more variables which is to be verified. 'Thesis' means position of these variables in the specific frame of reference.

Oxford dictionary: "Hypothesis is an idea or explanation of something that is based on a few known facts, but that has not yet been proved to be true or correct".

Goode and Hatt: "Hypothesis is a proposition which can be put to test to determine its validity."

Lundberg: "A hypothesis is a tentative generalisation, the validity of which remains to be tested. In its most elementary stage, the hypothesis may be any hunch, guess the imaginative idea, which becomes the basis for action or investigation."

Carter V. Good: "A Hypothesis is a shrewd guess or inference that is formulated and provisionally adopted to explain observed facts or conditions and to guide in further investigation"

P.V. Young: "Hypothesis is provisional central idea which becomes the basis for fruitful investigation, known as working theory."

Coffey: "Hypothesis is an attempt at explanation: a provisional supposition made in order to explain scientifically some facts or phenomena."

Thus, when a researcher formulates a hypothesis, he is actually making an educated guess based on scientific facts and evidences, which is further proven or disproven through the scientific method.

10.4 SOURCES OF HYPOTHESIS

A hypothesis may be formulated through a number of sources. However, following are the main sources of hypothesis:

1. Personal Experience and Creativity of the Researcher

Both creativity and experience are capable of deriving adequate hypothesis. While working in an environment, a researcher comes across many problems, some of which are serious enough and requires hard work to solve them. For example, a researcher who is working on the 'Classroom Correlates of Effective Teaching' can think of a host of factors such as teacher's mastery over the subject, effective use of teaching skills, decision-making, capability, perception of his competence, perception of student's capacity for better interaction, use of communication skills etc.

A critical analysis of these factors may facilitate the task of studying the relationship among the variables. Personal experiences of the researcher as a result of his personal readings of biographies, autobiographies, newspapers, research activities,

relevant literature, informal talks with friends, socio-political speeches, etc. can be the potential sources in the generation of a hypothesis.

2. Related Literature

Related literature is considered as the essential source of hypotheses formulation. It is necessary for a researcher to be thoroughly familiar with established facts and existing studies relating to the problem. It sharpens the perspective of a researcher and serves as a guide as to how to hypothesize the relationship among the variables, which aspects of relationship have been already studied and which still remain to be tested. A rich background of related knowledge enables the researcher to locate the key association among the variables and to find out the gaps in the existing research. Sansanwal (2020) in his book on Research Methodology and Applied Statistics explains that if a researcher wants to undertake research related to e-Marketing, then the researches conducted related to marketing shall be reviewed. He remarks that while reviewing researches one may find that no research has been conducted related to e-Marketing. Under such circumstances the researcher has to formulate hypothesis in Null Form (H_0). He further elaborates another case as, if a few researches have been conducted, it is difficult to give any direction as the base is not so strong. Thus, hypothesis should be formulated in a Null Form in this case as well.

3. Related Theory

A Theory is supposition or a system of an idea intended to explain something, especially one based on general principles independent of the thing to be explained. A researcher may undertake a research which is based on some theory. Sansanwal (2020) presented an example of formulating hypothesis on the basis of theory as if a researcher wants to study the effect of Reward on Memorisation of spellings by Grade 2 students, in this regard Skinner's Operant Conditioning Theory will serve as a basis for the formulation of hypothesis. In this case, the researcher should formulate hypothesis in Directional form only as related Theory is the base. The hypothesis in Null form cannot be justified in such cases.

10.5 TYPES OF HYPOTHESIS

Hypotheses in general, can be divided into two broad categories i.e. Research Hypotheses and Statistical Hypotheses in behavioural sciences. The researcher can formulate any one of these into his/her study but Statistical Hypotheses can be tested directly by making use of statistical techniques. The research hypotheses can be tested only through the Statistical Hypotheses.

1. Research Hypothesis

A research study proceeding on scientific lines starts with the research hypothesis. A research hypothesis is also regarded as scientific hypothesis. Best and Kahn (2006) define research hypothesis as a formal affirmative statement that predicts the tentative explanation of the relationship between two or more variables. This hypothesis focuses the investigation on a definite target and determines what observations or measures to be used.

A research hypothesis is classified as Directional Hypothesis and Non-directional Hypothesis

a) Directional Hypothesis: In a directional hypothesis, the researcher predicts the direction of a change, a difference, or a relationship for variables in the total population of people. A researcher selects a sample of people from a population and predicts that the scores will be higher, better, or changed in some way. This type of hypothesis is formulated to predict the relationship between the two or more dependent and independent variables and the nature and direction in which the change might occur, i.e., less, more, greater, smaller etc. The directional hypothesis is formulated in the research when the researcher is looking for a specific outcome from the study. For example, a directional hypothesis is formulated as under:

- Increase in the number of study hours results in higher academic achievement.
- People with high emotional intelligence are better adjusted at workplace.

b) Non-directional hypothesis: A variation on the directional hypothesis is the non-directional hypothesis. In a non-directional hypothesis the researcher predicts a change, a difference, or a relationship for variables in a population but does not

indicate whether the direction of this prediction will be positive or negative, or greater or less. This type of hypothesis is formulated to predict that there exists a relationship between the two variables but does not anticipate the exact direction of the relationship between the two variables. It is used when there is no theory involved. It is a statement that a relationship exists between two variables, without predicting the exact nature (direction) of the relationship.

For example, a directional hypothesis is formulated as under:

- Number of study hours affects academic achievement.
- Emotional intelligence affects adjustment at workplace.

2. Null Hypothesis

Null hypothesis is the most traditional form of writing a hypothesis. It is denoted by "HO". A null hypothesis proposes no relationship between two variables. To study this hypothesis, researcher selects a sample of all possible people and draw conclusions from the statistical analysis of this sample for the population. A null hypothesis might begin with the phrase "There is no significant difference between" groups or "There is no significant relationship between (or among)" variables. The null hypothesis predicts that the results will show no or little effect. It is a predictive statement that researchers use when it is thought that the independent variable will not influence the dependent variable. If the sample results do not support the null hypothesis, researcher should conclude that something else is true. What researcher concludes rejecting the null hypothesis is known as alternative hypothesis. It is denoted by H1. In other words, the set of alternatives to the null hypothesis is referred to as alternative hypothesis.

Null hypothesis is formulated as under:

- There is no significant relationship between number of study hours and academic achievement.
- There is no significant relationship between emotional intelligence and adjustment at workplace.

The null hypothesis and alternative hypothesis are formulated before the sample is drawn. Alternative hypothesis is usually the one which one wishes to prove and null hypothesis

is the one which one wishes to disprove. Thus, a null hypothesis represents the hypothesis, a researcher is trying to reject, and alternative hypothesis represent all other possibilities.

10.6 CHARACTERISTICS OF A GOOD HYPOTHESIS

Hypothesis is not just a simple guess. Hypotheses are generally formulated on the basis of the results of the previous studies. In fact, many researches are carried out with the objective of testing hypotheses. Following are some of the characteristics of a good hypothesis.

1. **Hypothesis should be clear and precise.** Hypothesis should be formulated in clear and precise terms. A clear statement of hypothesis generally involves concise technical language and definition of terms that are better defined than those in common language. Vague terms or constructs are difficult to define operationally. If the hypothesis is not formulated in clear and precise manner, the inferences drawn on its basis cannot be taken as reliable. So, the terms used in formulating hypothesis should be crystal clear and unambiguous.
2. **Hypothesis must be testable:** Hypothesis should be testable. It means a hypothesis should be capable of being accepted or rejected on the basis of observation and experimentation. If a hypothesis cannot be tested by making observations or experimentation, it cannot be regarded as scientific.
3. **Hypothesis should state the relationship between variables:** Variables are measurable characteristics or properties of people or things that can take on different values. A hypothesis is a tentative statement about the relationship between two or more variables. It is a specific, testable prediction about what the researcher expects to happen in a study. It should presume a relationship between two or more variables in a way that can be tested with empirical data.
4. **Hypothesis should be limited in scope:** A hypothesis should be limited in scope. Sometimes an over-ambitious researcher formulates an ambiguous hypothesis of global significance. A researcher must remember that narrower hypotheses are generally more testable and he should develop such hypotheses.
5. **Hypothesis should be stated in simple terms:** Hypothesis should be stated as far as possible in most simple terms. Researcher should not make use of vague

terms or constructs while formulating hypotheses. It is useless to formulate hypothesis that makes use of terms or constructs which do not convey the intended meaning to the readers. The researcher should make use of generally accepted terms for naming a phenomenon.

6. **Hypothesis should be within the ambit of the available research techniques:** Hypothesis should be formulated within the ambit of the available research techniques. The researcher should be aware of the available research techniques which can be used to measure the concepts and variables embodied in the hypothesis. It does not however mean that hypotheses which are not testable with the available techniques of research are not to be made. If the problem is too significant and therefore the hypothesis framed becomes too ambitious and complex, its testing becomes possible with the development of new research techniques or the hypothesis itself leads to the development of new research techniques.
7. **Hypothesis should be consistent with the existing theory:** A hypothesis must be related to the existing theory or should have a theoretical orientation. The growth of knowledge takes place in the sequence of facts, theory, law or principles. It means the hypothesis should have a correspondence with the existing facts and theory. If hypothesis is related to existing theory, the research work will enable the researcher to support, modify or refute the existing theory. Theoretical orientation of the hypothesis ensures that it becomes scientifically useful.

10.7 IMPORTANCE OF HYPOTHESIS

The importance of hypothesis is generally recognized more in the studies which aim to make predictions about some outcome. In experimental research, the researchers are interested in making predictions about the outcome of the experiment or what the results are expected to show and therefore the role of hypotheses is considered to be of utmost importance. In the historical or descriptive research, on the other hand, the researcher is investigating the history of a city or a nation, the life of a man, the happening of an event, or is seeking facts to determine the status quo of some situation and thus may not have a basis for making a prediction of results.

Different authors have expressed their view-points regarding the importance of formulating hypotheses summarized as under:

The importance of hypotheses may be summarized as under.

- 1. Facilitate the extension of knowledge:** Hypotheses provide tentative explanations of facts and phenomena, and can be tested and validated. It sensitizes the investigator to certain aspects of situations which are relevant from the standpoint of the problem in hand.
- 2. Logical order of relationships:** Hypotheses help in developing a logical order of relationships which seek to describe or to explain conditions or events, that have not yet been confirmed by facts. It enables the researcher to relate logically known facts to intelligent guesses about unknown conditions.
- 3. Guide to the thinking process:** It is a guide to the thinking process and the process of discovery. It is the investigator's eye - a sort of guiding light in the work of darkness. It provides the map that guides and expedites the exploration of the phenomena under consideration.
- 4. Provide direction to the research:** Hypothesis provides direction to the research and helps in preventing the collection of useless or irrelevant data. It provides a basis for selecting the sample and the research procedures to be used in the study. The statistical techniques needed in the analysis of data, and the relationships between the variables to be tested, are also implied by the hypotheses. Furthermore, the hypotheses help the researcher to delimit his study in scope so that it does not become broad or unwieldy.
- 5. Provide the basis for reporting conclusions:** Hypotheses provide the basis for reporting the conclusions of the study. It serves as a framework for drawing conclusions. The researcher tests each hypothesis separately and states the conclusions that are relevant to each. On the basis of these conclusions, researcher can make the research report interesting and meaningful to the reader. It provides the outline for setting conclusions in a meaningful way.
- 6. Selection of research design:** It helps in deciding and selecting appropriate research design to pursue a study.

7. **Stimulate further research:** A hypothesis can also stimulate further research by generating new questions, insights, or hypotheses based on the results of your test.
8. **Accuracy and precision:** Hypothesis provides accuracy and precision to a research activity. Accuracy and precision is the feature of scientific investigation which is possible due to hypothesis.
9. **Link between theory and investigation:** Hypothesis establishes a link between theory and investigation. In other words, hypothesis acts as a bridge between theory and investigation.
10. **Link between assumption and observation:** Hypothesis also serves as a link between assumption and observation. Hypothesis acts as an assumption at the initial stage and is transformed into a working form in the field. This transformation takes place due to observation in the field. So, it creates a link between assumption and observation.

10.8 DIFFERENCE BETWEEN ASSUMPTION AND HYPOTHESIS

Assumption	Hypothesis
It is a kind of belief or idea which is considered to be true without sufficient evidence or proof.	It is a proposed explanation or prediction for a phenomenon that can be tested through experimentation or observation.
General assumptions may or may not require any methods for verification or acceptance. Research assumptions are generally proved by forming hypothesis based on them.	Various experiments can lead to various results. Thus, a hypothesis can be proved or rejected depending upon the method used by the scientists.
It is proved through arguments.	It is proved through experiments.
It is often based on personal experience or intuition, and can lead to biased or flawed conclusions.	It is typically based on prior knowledge or on some earlier theory, and is used to guide further investigation.
Assumptions are not statistically tested in research.	Hypotheses are statistically tested in research.
Used in everyday life to make decisions quickly or to simplify complex situations	Used in scientific research to guide the design of experiments and to evaluate the results of those experiments.
In research, it denotes the existence of the relationship between the variables.	In research, this is the expected relationship between variables.

Check Your Progress-1

Note: (a) Write your answers in the space given below.

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. Fill in the blanks

(i) Hypothesis is a _____ which can be put to test to determine its validity.

(ii) A hypothesis is a tentative generalisation, the validity of which remains to be _____.

(iii) Research hypothesis as a formal _____ that predicts the tentative explanation of the relationship between two or more variables.

(iv) It is the investigator's eye - a sort of _____ in the work of darkness.

(v) Hypothesis provides _____ and _____ to a research activity.

2. Explain the meaning of hypothesis.

3. Illustrate the major sources of hypothesis.

4. Mention the main characteristics of hypothesis.

10.9 LET US SUM UP

In short, it can be understood that a hypothesis is an assumption that researchers make on the basis of the limited evidence collected. It is the starting point of study that translates research questions into predictions. The various types of hypotheses include Null Hypothesis, Simple hypothesis, Directional hypothesis, Complex hypothesis, Non-directional hypothesis, and Causal and associative hypothesis. Thus, a hypothesis is tentative assumption drawn from knowledge and theory which is used as a guide in the investigation of other facts and theory that are yet unknown. It is a central core of study that directs the selection of the data to be gathered, the experimental design, the statistical analysis and conclusions drawn from the study. Since, hypothesis is a formulation of anticipated findings, students are advised to develop a hypothesis as a means of demonstrating the basis for their study to themselves and their reader.

10.10 LESSON END EXERCISE

1. Explain the meaning and sources of Hypothesis
2. Describe the major types of Hypothesis.
3. Elaborate main characteristics of a good Hypothesis.
4. Differentiate between Assumption and Hypothesis.

10.11 SUGGESTED READINGS

1. Freedman, P. (1960): Principles of Scientific Research. New York: Public Affairs Press.
2. Kerlinger, F. N (2004). Foundation of Behavioral Research, New Delhi: Surjeet Publications.
3. Sidhu, K. S. (1984). Fundamentals of Research in Education, New Delhi: Sterling publishers Pvt. Ltd.
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10.12 ANSWERS TO CHECK YOUR PROGRESS

- (i) proposition
- (ii) tested
- (iii) affirmative statement
- (iv) guiding light
- (v) accuracy and precision

INTRODUCTION TO SAMPLING TECHNIQUE

Statistics which are collected and analyzed are either descriptive or inductive in character. Descriptive statistics are those which describe some characteristics of a set of figures. As against this, inductive statistics refer to drawing inferences about a Population on the basis of the examination of a part of the population only. In other words, inductive statistics refer to estimating values of the population on the basis of sample study. In modern decision-making process in various fields of human activities, most of our decisions are based on the examination of a few objects only or, in other words, they are based on sample studies. This process of drawing inferences about a population on the basis of sample studies naturally involves an element of risk, because one may draw wrong inferences about a population by studying a sample. Modern statistical theory makes an attempt to evaluate this risk in terms of probability. Thus, one can find out the probability of his going wrong in drawing inferences about the population by studying a sample.

Even though the theory of sampling has been developed only during the last few decades, the idea of sampling is not new. People have been using sampling theory without knowing about it. Normally, people examine and inspect a small sample from a population and take a decision about accepting or rejecting the items of the whole lot from which the sample has been taken. For example, a grain merchant does not examine each grain of wheat that he purchases. He simply takes out a handful and from it gets an idea about the quality of the whole consignment. Similarly, a fruit merchant does not examine each and every apple, mango or guava he purchases. He inspects only a few of them. The corn merchant and the fruit dealer are not conversant with the theory of sampling; they simply believe that the sample gives them a correct idea about the population. This belief is built after years and years of experience. There is further, a belief that the larger the size of the sample selected. The better is the idea obtained about the population. If a fruit dealer

inspects only five apples out of 500, which he is purchasing, he may not get an accurate idea about the condition of the whole lot. In such cases, he will inspect some more and satisfy himself.

However, making inferences about the population on the basis of sample studies involves a risk in as much as there may be a difference in the value obtained from a sample and the actual value in the population. For example, if we try to have an idea about the average marks obtained by 500 students by studying a sample of 100, the mean that we get by the sample study may be different from the actual mean marks of the 500 students from which the sample has been taken. This difference between the sample value and the population value is known as sampling error.

TYPES OF POPULATION

Finite and Infinite Populations: Before discussing the methods by which samples can be selected and the results analyzed, it will be better to give an idea about the various types of populations from which samples can come. Broadly speaking, the populations can be of two types Finite and Infinite. By finite population we mean such populations which contain a definite number of units. Thus, the number of students in the Indian universities is a finite population. Similarly, the population of the Indian Union is a finite population. As against this, an infinite population is one, in which the number of units is infinite. Thus, the length of leaves of a tree or the height distribution of the Indian population or the production of wheat in India would give infinite populations. Even though it may be possible to measure the leaves of a tree or the heights of all the persons of India or the production of wheat in this country, the actual values would always vary within certain limits. The series that we shall get in such cases would be continuous, as exact measurements are not possible. As we shall see later on, infinite populations are better for sampling studies. We have already noted that the probabilities of various events can be better estimated if the population is infinite.

Hypothetical and Existent Populations: Populations can be classified as hypothetical and existent. Hypothetical population is one which does not consist of concrete objects. For example, if a dice is tossed, each throw is an individual unit and we can construct a population by throwing the dice a large number of times and recording its results. Such populations consist of an infinite number of items, because we can go on

throwing the dice any number of items we like, unless of course, it wears out. Existent population as the name suggests, refers to a population of concrete objects, like the number of persons having a certain income or the number of books with a certain number of pages, etc. We have noted that in the hypothetical population, the values of p and q remain constant in various trials, and this is a very important property of such populations. The probability of a dice falling with number 6 upwards will always remain $1/6$ in all possible throws, and this property enables us to fit a particular curve to such data with a high degree of accuracy.

Sample

A sample is a finite part of a population whose properties are studied to gain information about the whole population. Now that we have some idea about the type of populations from which sample can be chosen we would discuss in brief the main objects of sampling studies. It is obvious that the most important aim of sampling studies is to obtain maximum information about the phenomena under study with the least sacrifice of money, time and energy. If the sample study has been made in such a manner that we can obtain a large variety of information about the phenomena to which the sample relates, it would be easy for us to have an idea about similar information relating to the population. If, for example, the sample studies reacting to expenditure of selected students in Indian universities have been done properly, they would give us an idea about the distribution of expenditure of all the students in Indian universities. Thus, the aim of sampling studies is to obtain the best possible values of the parameters. (The word parameter is used to indicate various statistical measures, like mean, standard deviation, correlation, etc., in the population. As against this, the term statistic refers to the statistical measures relating to the sample.) This aim is best achieved if the sample studies are made in such a way that they disclose a mathematical relationship between the values of the distribution. For example, if it is found out that a particular frequency distribution obtained by a sample study conforms to Binomial, Normal or Poisson distribution, the parameter values can be very easily estimated and a high degree of reliance can be placed on them. Thus, a large part of sampling theory is devoted to finding out some constant of the population. If they are found out, a very accurate idea about the parent distribution is obtained from the sampling studies. Even if only the mean and standard deviation of the population can be estimated by some

mathematical relationship observed in the sample, it is enough to have an idea about many other parameter values.

CHARACTERISTICS OF A GOOD SAMPLE:

The fact that sampling studies, if properly conducted, give a fairly good idea about values in the population is based on the theory of probability. There are certain important laws on which sampling theory is based. Some of them are discussed below:

1. Law of Statistical Regularity of probability

The law of statistical regularity lays down that a group of objects chosen at random from a particular group tends to possess characteristics of that group (population) and a large number of items taken at random from each group are almost sure on an average to possess characteristics of each group. If a sample has been selected taking into account the above conditions, it can be expected that the inference drawn from the sample study would be by and large applicable to the population as a whole.

2. Principle of Inertia of Large Numbers

It is actually derived from the principle of statistical regularity. According to it, as sample size increases, results would be more reliable. Large numbers are relatively more stable in their characteristics than small numbers. It does not mean the variation in large numbers is not much. It is there; but it is much less than what it is in small numbers. For example, if we toss a coin ten times, it is quite likely that we may get 7 heads and 3 tails; but if we toss it 100 times, results would be more dependable and we may get, say, 60 heads and 40 tails. If the coin is tossed 1000 times, the likelihood is that the number of heads and tails would be very close to each other. Thus, larger the sample size, the more dependable are the results.

3. Principle of Persistence

If some items of the population possess some specific characteristics, these characteristics would be found in the sample also and even if the sample size is increased or the population is increased, these characteristics would be reflected in the same manner as in the previous case. For example, if on an average, 5% students pass the Chartered Accountants Examination in the first attempt, then this percentage would be reflected even

if the size of the sample is increased or the size of the population is also multiplied. This percentage would remain more or less constant.

4. Principle of Optimization

According to this principle, effort should be made to get best possible or optimum results both in terms of cost as well as efficiency. Larger the size of the sample, more would be the cost of conducting the survey, but better would be the efficiency also. The size is maintained in such a way that the results are optimized in terms of cost and efficiency. This principle aims at obtaining a desired level of efficiency at the minimum cost and, at the same time, of obtaining maximum possible efficiency with a given level of costs.

5. Principle of Validity

A sample design is called valid only when the inferences drawn from it are valid for the population from which the sample has been taken. At a later stage, we will arrive at a conclusion that, in general, samples which are drawn at random would be found to be more valid than those drawn otherwise. Even here, many considerations have to be kept in mind. Not only the sample has to be random, but its size has to be adequate and the collection of data and its analysis have to be scientifically done.

ERRORS IN SAMPLING

The word 'error' is used in a specialised sense in statistics. It does not mean the same thing as a 'mistake'. Mistake in statistics means wrong calculation or use of inappropriate method in the collection or analysis of data. Error, on the other hand, means "the difference between the true value and the estimated value." Errors in statistics may arise due to various reasons. Statistical errors arise due to a large number of factors. They may be due to inappropriate definitions of statistical units, bias of the investigator or the inherent instability of the collected data. Such errors are called Errors of Origin. Errors may also arise on account of manipulation in counting, measurement, description or approximation. Such errors are known as Errors of Manipulation. Yet another cause of statistical errors may be the use of incomplete data, errors may also arise on account of inadequacy of the size of the sample and all such errors are called Errors of inadequacy. Sampling and Non-Sampling Errors in statistics are classed in two categories, namely, (1) Sampling errors, and (2) Non-sampling errors.

Sampling Errors: Sampling errors have their origin in sampling and they arise on account of the fact that sample has been used to estimate parameters or population values. Such errors are not found in census enquiry where the whole population is investigated. Sampling errors are attributed to fluctuation of sampling and that is why they are called sampling errors. Such errors would always be there in sample studies, notwithstanding the fact that the sample has been properly chosen and it is of adequate size. Samples always give estimated figures about the population and the difference between the actual and estimated figures would always remain and the differences are called sampling errors.

NON-SAMPLING ERRORS

As distinct from sampling errors (which are due to drawing inferences about the population on the basis of the sample studies) non-sampling errors generally arise when data are not properly observed, approximated and processed. These are not chance errors. Such errors are present in both Census as well as Sample methods of survey. In the Census method, although the data are free from sampling errors, yet there could be non-sampling errors in them. The data obtained from sample surveys are subject both to sampling and non-sampling errors.

TECHNIQUES OF SAMPLING

There are basically two types of sampling:

Probability sampling and Non-Probability sampling:

Probability sampling is one in which every unit of the population has an equal probability of being selected for the sample. It offers a high degree of representativeness. However, this method is expensive, time-consuming and relatively complicated since it requires a large sample size and the units selected are usually widely scattered. Non-probability sampling makes no claim for representativeness, as every unit does not get the chance of being selected. It is the researcher who decides which sample units should be chosen.

Probability sampling

Probability sampling today remains the primary method for selecting large, representative samples for social science and business researches. The probability sampling requires following conditions to be satisfied: (1) complete list of subjects to be studied is available; (2) size of the population must be known; (3) desired sample size must be specified, and (4) each element must have an equal chance of being selected.

The six forms of probability sampling are: simple random, stratified random sampling, systematic (or interval) sampling, cluster sampling, multi-stage and multi-phase sampling.

(a) Simple random sampling

In this sampling, the sample units are selected by means of a number of methods like lottery method, pricking blind folded, Tippet's tables, computer, personal identification number(PIN) or by first letter.

Lottery method

This method involves three steps. First step is constructing the sampling frame, i.e., a list of the units of the target population, e.g., students' list, the electoral role in alphabetical order and numbered accordingly. Second step is writing numbers listed in the sampling frame on small pieces of paper and placing these papers in some vessel/drum/jar, etc. Third step is mixing all papers well and taking out one piece of paper from the jar. This process is continued until the required number of respondents is reached. For example, 50 houses are to be allotted to applicants out of 1,500 houses constructed. Here 1,500 pieces of papers numbered from 1 to 1,500 are put in a drum and mixed and some eminent person or some child is invited to take out 50 slips from the drum. If the number on the piece of paper is 535, the name on the list that corresponds to that number is identified and recorded. Thus, 50 numbers selected will be allottees of houses.

Tippet's table or random numbers method

Tippet has prepared a table of random numbers (of one to five digits each). These numbers are available in various forms, sizes and number combinations in the appendix of the texts on statistics. One such example of random digits in columns and rows is shown below:

Columns	Random Digits									
	1	2	3	4	5	6	7	8	9	10
1	37751	04998	66038	63480	98442	22245	83538	62351	74514	90497
2	50915	64152	82981	15796	27102	71635	34470	13608	36360	76285
3	99142	35021	01032	57907	80545	54112	15150	36856	03247	40392
4	70720	10023	25191	62358	03784	74377	88150	25567	87457	49512

Source: William G. Zikmund, Business Research Methods, (2nd ed.0, The Dryden press, Chicago, 1988:689

Many figures will be less than 10,100 and 1,000 or between 1,000 and 1,00,000 as shown in above table. Suppose 10 villages are to be chosen (between 500 and 15,000). Take any page and randomly choose numbers which are less than 15,000. The investigator

need not start from first row of column 1 in the table but may take any point as the starting point. What will be the probability of each number being selected in simple random sampling? It will be as follows:

$$\frac{\text{sampled voters}}{\text{total voters}} = \frac{2000}{50000} = \frac{2}{50} = \frac{1}{25} = 0.04$$

Here is another example. Two hundred teachers employed by seven English medium pre-primary schools in the city apply for attending a two-day seminar. The sponsors, however, only had money to pay for 30 participants. The seminar director, therefore, assigned each applicant a number from 001 to 200, using a table of random numbers that he found in a statistics textbook. He selected 30 names by moving down columns of 3-digit random numbers and taking the first 30 numbers within the range of 001 to 200. The director decided that this method was easier than picking numbers from the urn.

The advantages of simple random sampling are:

- (1) All elements have equal chance of being included.
- (2) It is the simplest of all sampling methods and easiest to conduct.
- (3) This method can be used in conjunction with other methods in probability sampling.
- (4) Researcher does not need to know the true composition of the population before hand, i.e., he requires minimum knowledge of population in advance.
- (5) Degree of sampling error is low.
- (6) Most statistical textbooks have easy to use tables for drawing a random sample.

The disadvantages of simple random sampling are:

- (1) It does not make use of knowledge of population which researcher may have.
- (2) It produces greater errors in the results than do other sampling methods.
- (3) It cannot be used if the researcher wants to break respondents into sub-groups or strata for comparison purposes.

(b) Stratified random sampling:

This is the form of sampling in which the population is divided into a number of strata or sub-groups and a sample is drawn from each stratum. These sub-samples make up the final sample of the study. It is defined as "the method involving dividing the population in homogeneous strata and then selecting simple random samples from each of the stratum". The division of the population into homogeneous strata is based on one or more criteria, e.g., sex, age, class, educational level, residential background, family type, religion, occupation and so on. Stratification does not involve ranking.

There are two types of stratified sampling: i) proportionate, and (ii) disproportionate. The former is one in which the sample unit is proportionate to the size of the sampling unit, while the latter is one in which the sample unit is not related to the units of the target population. Here is the example: The UGC and the NCERT are considering introducing value-oriented education for students in schools and colleges. The UGC commissioned a study to find out, among other things, the attitudes of students and teachers in schools and colleges on introducing this programme. The research concentrated on teachers in two types of institutions, viz., B.Ed. and non-B.Ed. colleges and secondary and higher secondary students (i.e., from 9th to 12th standard) in schools, and undergraduate students in colleges. The study suggested that teachers in B.Ed. institutions appeared more in favour of introducing value-oriented education than those in non-B.Ed. institutions. On the other hand, the college students were less in favour of this programme than the school students. The difference in the attitudes among students v/s students and teachers v/s students was found in terms of type of values to be inculcated, techniques for imparting values, conducting examinations for assessing the level of values inculcated, the nature of teachers to be appointed as educators, and so on. All this comparison becomes possible only on employing stratified random sample technique.

The advantages of stratified random sampling are:

Sample chosen can represent various groups and patterns of characteristics in the desired proportions.

It can be used for comparing sub-categories.

It can be more precise than simple random sampling.

The disadvantages of stratified random sampling are:

It requires more efforts than simple random sampling.

It needs a larger sample size than simple random sample to produce statistically meaningful results because each stratum must have at least 20 persons to make statistical comparisons meaningful.

The advantages of proportionate stratified random sampling are: (i) representation is enhanced, (ii) sampling error is reduced, and (iii) comparison of different strata becomes possible. The disadvantages of this method are: (i) it is somewhat complex method of determining sample; (ii) it involves more time to obtain elements from each strata, and (iii) the number of classification errors increases with more strata.

(c) Systematic (or interval) sampling

This sampling is obtaining a collection of elements by drawing every n th person from a pre-determined list of persons. In simple words, it is randomly selecting the first respondent and then every n th person after that; ' n ' is a number termed as sampling interval. When the sampling fraction method is employed, samples are drawn from a sampling frame on the basis of the sampling fraction that is equal to N/n , where N is the number of units in the target population and ' n ' the number of units of the sample. For instance, if the target population is 6,000 and the intended sample size is 400, the sampling fraction is 15 (i.e., 6,000 divided by 400), i.e., every 15th person from the list would be drawn.

Suppose selection interval (or fractional interval is 10.7; and random start (between 0.1 and 10.7) is 2.6, then the selected numbers would be:

$$2.6/2.6 + 10.7 = 13.3/13.3 + 10.7 = 24.0/24.0 + 10.7 = 34.7 \dots\dots$$

Therefore, numbers will be:

$$2/13/24/34 \dots\dots\dots$$

This is because numbers are rounded down to the last whole number.

In selecting elements, no number is skipped. But suppose a particular number is not available, and then number next to that is selected. Systematic sampling differs from simple random sampling in that in the latter, the selections are independent of each other; in

the former the selection of sample units is dependent on the selection of a previous one.

The advantages of systematic sampling are:

- (1) It is easy and simple to use,
- (2) It is rapid method and eliminates several steps otherwise taken in probability sampling,
- (3) Mistakes in drawing elements are relatively unimportant.

The disadvantages of this sampling are:

- (1) It ignores all persons between two nth numbers with the result that the possibility of over representation and under representation of several groups is greater, and
- (2) Since each element has no chance of being selected, it is not probability random sampling.

(d) Cluster sampling

This sampling implies dividing population into clusters and drawing random sample either from all clusters or selected clusters. This method is used when (a) cluster criteria are significant for the study, and (b) economic considerations are significant.

Initial clusters are called primary sampling units; clusters within the primary clusters are called secondary sampling units; and clusters within the secondary clusters are called multi-stage clusters. When clusters are geographic units, it is called area sampling. For example; dividing one city into various wards, each ward into areas, each area into each neighborhoods and each neighborhood into lanes.

We can take an example of a hospital. The issue is to ascertain the problems faced by doctors, patients and visitors in different units and to introduce some reformative programmes. Administratively, it will not be viable to call all doctors from all units nor a large number of patients admitted in different units like cardiology, neurology, orthopaedic, gynaecology, and so on. Treating each unit as a cluster, randomly selected doctors and patients-say two doctors and three patients or about 50 people all together-from all units may be invited for discussions. Arriving at a consensus for immediate reforms needed, a plan can be chalked out for seeking grant from the government.

The advantages of cluster sampling are:

- (1) It is much easier to apply this sample when large populations are studied or when large geographical area is studied,
- (2) Cost in this method is much less than in other methods of sampling,
- (3) Respondents can be readily substituted for other respondents,
- (4) Flexibility is possible,
- (5) Characteristics of clusters can be estimated,
- (6) It is administratively simple since no identification of individuals is necessary, and
- (7) It can be used when it is inconvenient or unethical to randomly select individuals.

The disadvantages of this sampling are:

Each cluster is not of equal size in selection of one district from one state, or one village from one block. The district or the village can be small, intermediate or large sized

Sampling error is greater;

Same individual can belong to two clusters and studied twice;

It lacks representation; and

There could be homogeneity in one cluster but heterogeneity in other.

The difference between cluster sampling and stratified sampling is that in the former, homogeneous group is classified into heterogeneous units, while in the latter, heterogeneous group is stratified into homogeneous units.

(e) Multi-stage sampling

In this method, sampling is selected in various stages but only the last sample of subjects is studied. For example, for studying the panchayat system in villages, India is divided into zones (say, four zones, viz., North, South, East and West), one state is selected from each zone say, Punjab, Rajasthan, Andhra Pradesh and Assam), one district is selected from each state, one block is selected from each district, and three villages are selected from each block. This will help us in comparing the functioning of panchayats in different parts of India. Sampling in each stage will be random but it can also be deliberate or purposive. Thus, multi-stage sampling can be combination of (i) simple + simple sampling,

(ii) simple + systematic (interval) sampling, and (iii) systematic + systematic sampling. We can take one example. Suppose bank employees are to be studied in one city for assessing their views on introducing reforms in banks, including use of computers. The names of all managers, accountants and senior clerks in all banks will be typed in the first stage. Suppose these names are typed in 100 pages, each page containing 20 names alphabetically. Out of 2,000 bank personnel, we have to take out a sample of 50 persons. We can do this first by taking out every tenth page (out of 100 pages), i.e., 10 pages, and from each page, we take out every fourth name (i.e., five bank employees from one page).

This will be the example of systematic plus systematic sample. The alternative is: take first 10 pages and select any one at random. In this way, select 10 pages out of 100 pages. From each page select any five names at random. This will be simple plus simple random sampling. The main advantage in this sampling will be that it will be more representative. Other advantage is that in all cases, complete listing of population is not necessary. This saves cost.

(f) Multi-phase sampling

The process in this type of sampling is same as in multi-stage sampling, i.e., primary selection, secondary selection, and so on. However, in a multi-phase sampling procedure, each sample is adequately studied before another sample is drawn from it. Consequently, while in multi-stage sampling, only the final sample is studied, in multi-phase sampling, all samples are researched. This offers an advantage over other methods because the information gathered at each phase helps the researcher to choose a more relevant and more representative sample. We can take an example. We are interested in studying MBA students in one city. Suppose there are five institutions imparting MBA education and in each institution, there are 30 students. Thus, firstly, the sampling frame of MBA students in five institutions will be constructed. These respondents will be studied with regard to their academic background (whether they are arts, science, commerce, engineering, medical students'; whether they are first or second divisioners. Of these 150 students, 50 will be selected randomly; say, 10 students from each institution having different academic backgrounds. After selecting these 50 students, 25 girls and 25 boys will be chosen. This sample will be the final sample for the study.

NON-PROBABILITY SAMPLING

In many research situations, particularly those where there is no list of persons to be studied (e.g., wife battering, widows, Maruti car owners, consumers of a particular type of detergent powder, alcoholics, students and teachers who cut classes frequently, migrant workers, and so on, probability sampling is difficult and inappropriate to use. In such researches, non-probability sampling is the most appropriate one. Non-probability sampling procedures do not employ the rules of probability theory, do not claim representativeness, and are usually used for qualitative exploratory analysis. The five types of non-probability sampling are: convenience, purposive, quota, snowball and volunteer.

(A) CONVENIENCE SAMPLING

This is also known as 'accidental' or 'haphazard' sampling. In this sampling, the researcher studies all those persons who are most conveniently available or who accidentally come in his contact during a certain period of time in the research. For example, the researcher engaged in the study of university students might visit the university canteen, library, some departments, play-grounds, verandahs and interview certain number of students. Another example is of election study. During election times, media personnel often present man-on-the-street interviews that are presumed to reflect public opinion. In such sampling, representativeness is not significant. The most obvious advantage of convenience sample is that it is quick and economical. But it may be a very biased sample. The possible sources of bias could be: i) the respondents may have a vested interest to serve in cooperating with the interviewer, and (ii) the respondents may be those who are vocal and/or want to brag. Convenience samples are best utilized for exploratory research when additional research will subsequently be conducted with a probability sample.

(B) PURPOSIVE SAMPLING

In this sampling, also known as judgmental sampling, the researcher purposely chooses persons who, in his judgment about some appropriate characteristic required of the sample members, are thought to be relevant to the research topic and are easily available to him. For example, suppose, the researcher wants to study beggars. He knows the three areas in the city where the beggars are found in abundance. He will visit only these three areas and interview beggars of his choice and convenience. The manufacturers (of cosmetics, oils, garments, etc.) select test market cities because they are viewed as typical cities with demographic profiles closely matching the national profile. Popular journals conduct surveys in selected metropolitan cities to assess the popularity of politicians and political parties or to forecast election results. Thus, in this technique, some variables are given importance and it represents the population but the selection of units is deliberate and based on prior judgment.

(C) QUOTA SAMPLING

This is a version of stratified sampling with the difference that instead of dividing the population into strata and randomly choosing the respondents, it works on 'quotas' fixed by the researcher. In the example of studying 50 MBA students from 150 students in five institutions, the researcher fixes the quota of 10 students from each institution, out of which five will be boys and five girls. The choice of the respondents is left to the interviewer. Determining quotas depends on a number of factors related to the nature and type of research. For instance, the researcher might decide to interview three boys out of five boys (from one MBA institution) from final year and two from previous year, or two studying the morning course (of two years) and three studying the evening course (of three years). Quota can also be fixed according to their proportion in the entire population. For instance, for studying the attitudes of persons towards use of loudspeakers in religious places in one educational institution with 100 males and 50 females belonging to different religions, quota can be fixed in the ratio of one female for every two males.

Further, quota may be fixed on the basis of number of persons in each of the three religious groups. The advantages of quota sampling are: (1) it is less costly than other techniques. (2) It does not require sampling frames. (3) It is relatively effective. (4) It can be completed in a very short period of time.

Its limitations are: (1) It is not representative. (2) It has interviewer's bias in the selection. (3) Estimating sampling error is not possible. (4) Strict control of fieldwork is difficult.

(D) SNOWBALL SAMPLING

In this technique, the researcher begins the research with the few respondents who are known and available to him. Subsequently, these respondents give other names who meet the criteria of research, who in turn give more new names. This process is continued until 'adequate' numbers of persons are interviewed or until no more respondents are discovered. For instance, in studying wife battering, the researcher may first interview those cases whom he knows, who may later on give additional names, and who in turn may give still new names. This method is employed when the target population is unknown or when it is difficult to approach the respondents in any other way. Reduced sample sizes and costs are a clear advantage of snowball sampling. Bias enters because a person known to someone (also in the sample) has a higher probability of being similar to the first person. If there are major differences between those who are widely known by others and those who are not, there may be serious problems with snowball sampling.

LESSON END EXERCISE

1. Explain the term 'population and sample'.
2. What do you mean by sampling? Describe briefly the main types of sampling methods.
3. What do you mean by probability and non-probability sampling?
4. What is simple random sampling?
5. Explain the need for 'sample'.
6. What is Stratified sampling?
7. What do you mean by cluster sampling? When we use it give an example of it.

RESEARCH PROPOSAL

STRUCTURE

- 14.1 Introduction
- 14.2 Objectives
- 14.3 Meaning of Research Proposal
- 14.4 Importance of Research Proposal
- 14.5 Writing style of a Research Proposal
- 14.6 Let us Sum Up
- 14.7 Lesson End Exercise
- 14.8 Suggested Further Readings
- 14.9 Answers to Check Your Progress

14.1 INTRODUCTION

Proposing research is a major step in conducting research for a particular programme. The preparation of research proposal is a necessary prerequisite in the research process. The researcher is required to propose a study in the form of a well-prepared written document termed as research proposal for seeking approval of the proposed research project from the respective organization or authority. It serves as a basis for determining the feasibility of the project. It provides a systematic plan of procedure for the researcher to follow. In order to develop a dissertation or thesis, the researcher is first required to prepare a proposal, which is a formal description of a plan to pursue a study.

This process begins by considering what topics to include in a plan so that readers can fully understand the project. This initial planning process ends with a presentation of your proposal to a committee.

14.2 OBJECTIVES

After reading this lesson, you shall be able to:

- explain the meaning of research proposal.
- elaborate the importance research proposal.
- describe the writing style of a research proposal.

14.3 MEANING OF RESEARCH PROPOSAL

A research proposal is a systematic plan for a research report, initiated and developed before the research actually begins. It is usually defined as a written document containing details of the plan, procedure, possible outcomes and underlying rationale of a study to be conducted by a researcher. It is submitted to a concerned organization or authority for seeking its approval to conduct the proposed research study. It is like a blueprint which the architect prepares before the construction of a building starts.

Thus, a research proposal is an outline of proposed work required by universities and institutions for the

14.4 IMPORTANCE OF RESEARCH PROPOSAL

To develop a dissertation or thesis, you first create a proposal, which is a formal description of a plan to investigate a research problem. This process begins by considering what topics to include in a plan so that readers can fully understand the project. The next step is to organize and format the plan to be consistent with quantitative or qualitative research. This initial planning process ends with a presentation of your proposal to a committee.

1. The purpose of a proposal is to help an investigator think through all aspects of the study and anticipate problems.
2. The writing of a research proposal allows the researcher to plan and review the steps that will be undertaken in the research.

3. It provides an opportunity to the researcher to spot flaws in the logic, errors in assumptions and even problems that are not adequately addressed by the objectives and design of the study.
4. It serves as a guide for the researcher throughout the investigation.
5. It helps the researcher in time management and budget estimate. These estimates allow the researcher to plan the project in such a way that the work progresses steadily towards the deadline.
6. Research proposal provides criteria to assess the quality of a project. Those evaluating and reviewing a study use these criteria. Knowing the proper elements of a good proposal permits evaluators to examine projects for these elements, and to determine, once the researcher completes, whether it fulfills its goals.

14.5 WRITING STYLE OF A RESEARCH PROPOSAL

Before writing a research proposal, it is often valuable to have the knowledge of the basics about the style of writing a research proposal. Hence, a plan is essential and there are a variety of styles a researcher can use while structuring a research proposal. Some organisations may have specific requirements which will be set out in the application criteria and it is essential to follow the guidelines, tailoring the proposal to address the specific guidelines. There is however an expected level of content and headings that can be broadly applied to most research proposals.

One of the most demanded formats is the American Psychological Association (APA) style, which follows a specific format as given in the American Psychological Association guidelines. It is widely accepted style of documentation, particularly in the social and behavioural sciences. APA style specifies the names and order of headings, formatting and organisation of citations and references and the arrangement of tables, figures and appendices as well as other manuscript and documentation features. The APA Publication Manual provides basic guidelines for documenting both print and electronic resources. Here is the general APA format:

- 12-point font Times New Roman

- Double-spaced
- 1-inch margins
- An APA running head (limited to 50 characters)
- A title page with the paper's title (no more than 12 words in length), name of the researcher, and the name of the institution
- An abstract (150-200 words)
- In-text citations
- References page

The APA style research proposal allows the researcher to create a proposal with a consistent style. Specific standards are provided in the APA Referencing guide for research proposals. Below is the research proposal format as per APA 7th edition guidelines.

1. Margins, Header & Footer

All sides must have a 1-inch margin. The header format is right justified, with the proposal title on the left and the page number on the right. The running header should not be more than 50 characters long; it should begin on the cover page and continue throughout the proposal. If the title is more than 50 characters, reduce it to include the keywords.

2. Fonts, Size & Space

APA style calls for a serif typeface, ideally Times New Roman. Use a single font type font size (12 pt) throughout your paper. Each word must be double-spaced, with a five-space indentation.

3. Abstract

The abstract appears after the title page. Write the abstract in 250 words or less, and include a statement about the study and methodologies that will be employed.

4. Title Page

The proposal headline will be positioned in the centre, halfway down the page, in

the proper format for the title page. The headline is followed by the name of investigator and the name of the organization or university.

5. Introduction

The introduction is on the next page of the proposal; it comprises the main concept behind the research, the setting of the study, the issue that it will address, and the individuals who will benefit. The section can be up to three pages long.

6. Literature Review

Following the introduction, the researcher is required write a brief review of the literature to gain a thorough understanding of the problem. The researcher must relate the research to similar studies in the field and incorporate a structure that will be followed in the survey about existing knowledge in the area. The section might be as long as 7 pages approximately.

7. Research Methodology

Researcher has to list and briefly explain research methodologies that will be used in the research. It should include everything from data collection to analysis and how each will be justified. According to the criteria, APA research methodology can only have a maximum of 5 pages.

8. Limitations

It is necessary to describe the study's potential limitations; keep this to half a page.

9. Significance

Limitations are followed by the significance of the research, its tangibility, practicability, and ramifications. The proposal must explain the likely result and what it hopes to achieve in research. The part is typically two pages long.

10. References, Bibliography & Citation

Include a section for every reference used in the proposal's authoring. The APA proposal format must have; the author and year must be mentioned when quoting or paraphrasing; and there is no bibliography section in APA format.

11. Appendix

If any, is attached at the end.

Check Your Progress-1

Note: (a) Write your answers in the space given below.

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. Fill in the blanks

- (i) A research proposal is a _____ for a research report, initiated and developed before the research actually begins.
- (ii) One of the most demanded formats of research proposal is the _____.
- (iii) The most acceptable fonts to be used in a research proposal are _____.
- (iv) Before writing a research proposal, it is often valuable to have the knowledge of the basics about the _____ a research proposal.

2. Define the term Research Proposal

3. Discuss the style of writing a Research Proposal.

4. Mention the importance of writing a Research Proposal

14.6 LET US SUM UP

Research proposal is written proposal before conducting the research. It is regarded as systematic plan for a research report, initiated and developed before the research actually begins. In a proposal, the researcher writes about what will take place during the course of research. It is type of written document containing details of the plan, procedure, possible outcomes and underlying rationale of a study to be conducted by a researcher. APA style should be viewed as a "genre" of writing that is ideal for presenting psychological research findings, particularly in academic and professional settings.

14.7 LESSON END EXERCISE

1. Discuss the meaning of Research Proposal
2. Elaborate the importance of Research Proposal
3. Describe the writing style of a Research Proposal

14.8 SUGGESTED FURTHER READINGS

1. Freedman, P. (1960): Principles of Scientific Research. New York: Public Affairs Press.
2. Kerlinger, F. N (2004). Foundation of Behavioral Research, New Delhi: Surjeet Publications.
3. Sidhu, K. S. (1984). Fundamentals of Research in Education, New Delhi: Sterling publishers Pvt. Ltd.
4. Vijay, U. and &Arvind, S (2010). Research Methodology. New Delhi: S. Chand & Company Pvt. Ltd.
5. Mishra, R.P.(2002.) Research Methodology. New Delhi: Concept Publishing Company.
6. Sansanwal, D.N. (2020). Research Methodology and Applied Statistics. Delhi: Shipra Publications.

7. Kothari, C.R. and Garg, G. (2019). Research Methodology: Methods and Techniques. New Delhi: New Age International (P) Limited, Publishers.
8. Chandra, S.S. and Sharma, R.K. (2007), Research in Education. New Delhi: Atlantic Publishers & Distributors (P) Ltd.
9. Good, C.V. (2016). Introduction to Educational Research. Delhi: Surjeet Publications.
10. Pandya, S. R. (2021). Educational Research. New Delhi: A P H Publishing Corporation.
11. Koul, L (2019). Methodology of Educational Research. Noida, U.P.:Vikas Publishing House.
12. Jha, A. S. (2017). Research Methodology. New Delhi: A P H Publishing Corporation.

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- (i) systematic plan
- (ii) American Psychological Association (APA) style
- (iii) Times New Roman
- (iv) style of writing

STEPS OF PREPARING RESEARCH PROPOSAL

STRUCTURE

- 15.1 Introduction
- 15.2 Objectives
- 15.3 Steps of preparing Research Proposal
- 15.4 Style of writing Bibliography/References in (APA, MLA and CMS)
- 15.5 Let us Sum Up
- 15.6 Lesson End Exercise
- 15.7 Suggested Further Readings
- 15.8 Answers to Check Your Progress

15.1 INTRODUCTION

A research proposal is intended to convince readers that the researcher has the competence and the work-plan to complete the research project. Generally, a research proposal should contain all the key elements involved in the research process and include sufficient information for the readers to evaluate the proposed study. It outlines the importance of research problem and summarizes how the researcher plans to investigate the selected research problem.

The proposal has to be crystal clear, direct to the point, and persuasive, making a strong

argument for the significance of the study, its future contribution, and the original strategy the scholar would employ.

15.2 OBJECTIVES

After reading this lesson, you shall be able to:

- explain the steps of writing research proposal.
- discuss the Style of writing Bibliography/References in (APA, MLA and CMS)

15.3 STEPS OF PREPARING RESEARCH PROPOSAL

Many institutions and funding agencies prescribe their formats for the submission of research proposal. There may be a slight variation in the suggested formats however, a good research proposal should contain three major sections comprising of different sub-sections as explained under:

Introductory Section

This section of the research proposal should contain the following information:

1. **Title page:** The title page of the proposal should include:
 - a) The title of the proposed study. Title is basically the name of the topic of the research study. Title includes important 'key words' that relate the research proposal to the specific field of study. The title should be short and descriptive statement that clearly conveys the core idea of the research proposal.
 - b) The title page should also contain researcher's name and his/her identification, supervisor's name, name of the department and institution.
2. **Introduction:** Introduction of the research proposal intends to provide the readers with the background information and rationale of the present study. Researcher organizes his/her discussion around the following themes:
 - a) **Background of the study:** The background of study discusses in depth about the topic. For example, if a researcher intends to study the effect of emotional intelligence on job satisfaction of teachers, he or she has to begin with the concept of emotional intelligence and its relationship with job satisfaction.

- b) **Statement of the problem:** Statement of the problem is an expansion of the title. Here, the researcher is required to state and define the research problem in clear and concise terms. The statement should clearly indicate the key variables in the study, specify the nature of population being studied and suggest the possibility of empirical testing.
- c) **Review of Related Literature:** The theoretical and empirical framework from which the problem arises must be briefly described. The latest research trends related to the problem should also be mentioned in the section. The researcher has to establish that the problem has its roots in the existing literature, but it needs further exploration to fill the gaps. A brief account of the related studies found in journals, magazines, abstracts or periodicals should be maintained to make the readers familiar with what is already known and also with what is unknown and unproved. It helps in eliminating the risk of duplication of research and provides a basis for formulating hypotheses.
- d) **Purpose of the Study:** The investigator should state clearly the reasons for undertaking the research. A specific research study may have two or more goals.
- e) **Objectives of the study:** This should include the specific objectives to be achieved in the proposed study. The objectives should be clearly stated in achievable and measurable terms. The objectives will provide the criteria against which the proposed research methods can be assessed. Objectives should be formed on the basis of specific questions to be answered.
- f) **Formulation of hypotheses:** A hypothesis is an educated guess or a testable prediction based on the existing literature to be tested on the basis of evidence. This step establishes the problem and the logic underlying the research study. It gives direction to the data gathering procedure.
- g) **Significance of the study:** The significance of a study in a research proposal refers to the importance or relevance of the study. It explains why the research is valuable, relevant, and important to the academic or scientific community, policymakers, or society at large. It should indicate clearly how the results of

the research can influence educational theory or practice.

- h) **Definitions of terms and concepts:** This refers to the clarification of the terms used in the study in such a way that they are potentially observable. The technical terms like intelligence, motivation, creativity, stress, achievement etc. used in the study do not have a unanimous definition. It becomes obligatory on the part of the researcher to define such terms operationally by stating how these variables will be observed and measured.
- i) **Delimitations of the study:** Delimitations are the boundaries that the researcher sets in a research study, deciding what to include and what to exclude. They help to narrow down the study and make it more manageable and relevant to the research goal. In other words, they are the boundaries the researcher sets in terms of scope of study, population size and type of participants, sampling procedure, data collection techniques, statistical techniques, development of measuring techniques and their use in the study. etc.
- j) **Assumptions:** An assumption is a statement whose truth is either considered self-evident or has been satisfactorily established by earlier research. This will act as a foundation of accepted knowledge.

Procedural or Methodological Section

This section is mainly focused on describing planning on the part of the researcher about the execution of the research. Here, the researcher outlines the research strategy, research design, research methodology, data sources, population consideration and sample size determination, data collection methods and tools, methods of data analysis. This part should explain clearly and completely the following:

- a) **Population and sample:** A research proposal should clearly define the population from which the researcher will draw sample. Here, the researcher is required to describe what he is studying, including the units involved in sample and the target population as well as the procedure he will use to select the sample.
- b) **Tools or instruments of data collection:** Here the researcher is required to mention about the type of tools or instruments that he will use for the collection

of data from the selected sample including reliability and validity testing of the instruments.

- c) Selection of research design: The research design indicates the steps that will be taken to carry out the research and in what sequence they will occur.
- d) Procedure employed for data collection: Here the researcher is required to describe the procedure employed for collecting data i.e. how he will use the tools and approach the subjects or seek the cooperation from different persons for the collection of data.
- e) Data analysis techniques: In this sub-section of the research proposal, the researcher is required to describe the methods, techniques or procedure employed for the analysis of collected data.

Other components to be included in the research proposal

- a) Time schedule: Researcher should prepare a time-schedule for carrying out the research effectively. Dividing the project into manageable parts and allotting time for their effective execution will help the researcher to complete the study systematically within stipulated period of time.
- b) Budget: The research proposals submitted to various agencies for financial assistance should also include a requirement of budget needed to meet the expenditure incurred on various components for the execution of the study.
- c) Ethical Considerations

Ethical considerations are an important aspect of research proposal and there is a standard university code of practice relating to ethics, which a researcher must read and understand. The value of ethics is to protect the individuals and their identity, both in verbal and written form. Researcher is required to include copies or format of obtaining written consent from individuals and parents to get approval from Ethical Consideration Committee.

- d) Bibliography: In this sub-section of the research proposal, the researcher is required to write a list of all the books, journals or any other literature used by the researcher in preparing research proposal or literature that will be used by the researcher later on during the execution of the study.

Appendices

This section should provide relevant documents which are best not seen in the main proposal text (because they affect readability). These may be source documents, pilot study data, interview questions, surveys questionnaires instruments, etc. Time Schedule

The researcher should prepare a time schedule for completing the study within stipulated period of time. It is advisable to divide the study into phases and assigning dates for the completion of different components of the study.

Budget Schedule

The research proposals seeking financial assistance from an external source should include a budget proposal estimating the funds required for travel expenses, typing, printing, purchase of equipment, software, tools, books and other materials.

Conclusion

The conclusion contains the overall summary of the proposal.

15.4 STYLE OF WRITING BIBLIOGRAPHY/ REFERENCES

In writing books, thesis or any other papers we may recite the findings or workings of others. It is not

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This section is a very important component of the research proposal. It contains all the

necessary literature that has been referred to in preparing research proposal or to be consulted during the research. References differ from bibliography in that references are those materials which have been cited in the main text of the proposal in different places. Bibliography includes many referred as well as many unreferred literature in the text of the research proposal. Sometimes a book would have been consulted but not necessarily referred to in the text. Thus, the bibliography will be inclusive of many materials which have not been referred in the text. Of course it may contain the referred materials also. On the other hand, references contain basically the referred materials.

In writing references, a researcher should use an accepted style manual. When using a style manual, the research (and the literature review) will have a consistent format for readers and other researchers, and this format will facilitate their understanding of the study.

American Psychological Association (APA) style

The Publication Manual of the American Psychological Association, 6th edition (APA, 2010), style manual is the most popular style guide in educational research. Hence, the same is emphasized here for the references listed at the end of a research report called as end-of-text references. In APA form, they are double spaced and listed alphabetically by author. The APA manual provides examples of the most common kinds of end-of-text references. Below are illustrations of common types of references in appropriate APA form.

Title and Spacing

- The reference list should start on the new page. It should be Centred and titled References.
- The entries should be Double-spaced.
- Individual entries should have a hanging indent i.e. first line of entry is flush with the left margin, subsequent lines indented).

Order of entries

- Entries are alphabetized by author's last name.

- Works for multiple authors be alphabetized by the last name of the first listed author.
- Multiple works by the same first author, but different subsequent authors are alphabetized within the list by the last name of the first author, and then alphabetized amongst themselves by the first unique last name.
- When author is a group, alphabetize by the first significant word in the group's name.
- Works with no author should move the title to the author position (before the date of publication) and alphabetize by the first significant title word.

Elements of an entry

- Each entry usually contains the following four elements: a) author b) publication date c) title and d) publishing data.
- Commas generally separate items within an element.
- Periods are generally used to end an element.

a) Author

- Last name, A.A., Last Name B.B, &Last name, C.C.
- Use commas between an author's last name and initials, between initials and suffixes, and between multiple authors.
- When there are multiple authors, & should precede the last named author.
- Provide author last names and initials for works by one to six authors. For, seven follow the sixth author by a comma and the abbreviation et.al.
- If the work has not author, move the work's title to the author position of the entry.
- Edited books generally treat the editor as the author. Follow editor name with (Ed.) or (Eds.) whichever is applicable.
- For a chapter in a book, the chapter author is the author listed for the entry.

b) Publication date

- The year of publication is enclosed in parentheses. It usually follows the author name and precedes the title.
- For magazines, newsletters and newspapers, provide the year followed by the exact date as given on the publication as month, month and day, or season of the issue e.g. (YYYY, Month dd) or (YYYY, Season).
- If no date is available, enter (n.d.)

c) Title

Capitalization & italics

- For published periodicals, capitalize the first letter of all significant title words. In the journal article example, capitalize all words in the journal title.
- For non-periodicals, book chapters and articles, capitalize only the first word, and proper nouns, of titles and subtitles.
- In the book example, capitalize only the first word in the title of the book, the first word following a colon in the title, and proper nouns.
- Italicize titles of whole works for both periodicals and non-periodicals. Do not italicize the titles of parts of a larger work -e.g. chapters in books, articles in journals, etc.

Periodicals

- Provide the title of the periodical, the volume number, if any, and inclusive page numbers.
- Do not use abbreviation vol. before the number, use Arabic numerals (1,2,3, etc.) to indicate volume numbers.
- If a periodical does not use volume numbers, include the month, season, or other designation following the year of publication -e.g. Author, A.A. (2001, June).
- If a journal paginates each issue separately (i.e. each issue starts its numbering with page 1) provide the issue number in parenthesis, exactly after the volume

numbers -e.g. 42(3), 28-34.

" When noting page numbers in any entry for a newspaper article, precede number(s) with p. or pp.

d) Place of publication and publisher (non-periodical)

- Provide the city, state (or province where applicable) and country (if outside the United States).
- Place a colon after the place of publication and provide the name of the publisher. Use 2-letter abbreviation for states.
- If two more publisher locations are listed, give the first or the home office (if known).
- Write in full the name of associations, corporation and university presses. Omit terms like Publishers, Co., or Inc., not required to identify the publisher. Keep the words Books and Press.

Additional Information for Electronic Publications

With increasing frequency, electronic journal publishing and materials located on the Internet are common today. Two ways to identify material obtained on the Internet are to provide a URL or a DOI (digital object identifier) number to the reference information.

The URL is used to map digital information on the Internet. A URL contains several components: a protocol, a host name, the path to the document and the specific file name, such as <http://www.rlynn.co.uk/index.php?page=papers>. The words "Retrieved from" precede the URL name of a journal article reference.

URLs are often changed on the Internet, and scholarly publishers have increasingly used the assignment of a DOI to journal articles and to documents. The DOI System provides a means of identification for managing information on digital networks (see <http://www.doi.org/>). A DOI is a unique alphanumeric string assigned by a registration agency to identify content and provide a persistent link to its location on the Internet. The DOI number is typically located on the first page of the electronic journal article, close to the copyright notice. When cited in a reference, this number is placed at the end of a reference.

Book with One Author

Elements of the reference

Author(s) of book - family name and initials.. (Year of publication). Title of book - italicised.
Place of publication: Publisher.

Gardner, H. (1983). *Frames of mind*. New York: Basic Books.

Koul, L. (1984). *Methodology of educational research*. New Delhi: Vikas Publishing House Pvt Ltd.

Singh, D. (2001). *Emotional intelligence at work: A professional guide*. New Delhi: Response books.

Singh, D. (2006). *Emotional intelligence at work: A professional guide (3rd ed.)*. New Delhi: Response Books.

Sternberg, R.J. (1985). *Beyond IQ*. New York: Cambridge University Press.

Book with Two Authors

Elements of the reference

Author(s) of book - family name and initials, use & for multiple authors. (Year of publication).
Title of book - italicised. Place of publication: Publisher.

Kothari, C.R., &Garg, G. (2019). *Research methodology: Methods and techniques*. New Delhi: New Age International (P) Limited, Publishers.

Book with Three to Five authors

Elements of the reference

Author(s) of book - family name and initials, use & for multiple authors. (Year of publication).
Title of book - italicised. Place of publication: Publisher.

Matthews, K.A., Weiss, S.M., Detre, T., Dembroski, T.M., Falkner, B., Manuck, S.B. &Williams, R.B. (1986). *Handbook of stress, reactivity, and cardiovascular disease*. New York: Wiley

Book with Six or Seven Authors

Matthews, K.A., Weiss, S.M., Detre, T., Dembroski, T.M., Falkner, B., Manuck, S.B. & Williams, R.B. (1986). Handbook of stress, reactivity, and cardiovascular disease. New York: Wiley

Electronic Book

Elements of reference

Author, A. A. (Year of publication). Book title . DOI or Retrieved from URL

Reichow, B. (2011). Evidence-based practices and treatments for children with autism. Retrieved from <http://www.springlink.com/content/xt2514>

Journal Articles

Print Journal Article-One author

Elements of the reference

Author(s) of journal article - family name and initials, use & for multiple authors. (Year of publication). Title of journal article. Journal name - italicised, Volume - italicised (Issue or number), Page number(s).

Joshi, G. (2000). Neuroticism, extraversion and academic achievement as related to gender and culture. *Indian Psychological Review*, 54(1-2), 74-78.

Journal article (print or electronic) with URL- one author paginated by issue

Elements of the reference

Author(s) of journal article - family name and initials, use & for multiple authors. (Year of publication). Title of journal article. Journal name - italicised, Volume - italicised (Issue or number), Page number(s). Retrieved from: <http://www.xxxxxxxxxx>

Lynn, R. (1994). Sex differences in brain size and intelligence: A paradox resolved. *Personality and Individual Differences*, 17(2), 257-271. Retrieved from <http://www.rlynn.co.uk/index.php?page=papers>

Journal article (print or electronic) with DOI - one author - paginated by issue

Elements of the reference

Author(s) of journal article - family name and initials, use & for multiple authors. (Year of publication). Title of journal article. Journal name - italicised, Volume - italicised(Issue or number), Page number(s). doi:xx.xxxxxxxxxx

Smith, J. P. (2005). Mixed methods research: Its controversies and potential. *Journal of Mixed Methods Research*, 3(1), 34-50. doi: 1038/0278.6133.24.2.226

Two Authors

Amirtha, M. &Kadhiravan, S. (2006). Influence of personality on the emotional intelligence of teachers. *Edu Tracks*, 5(12), 25-29.

Three Authors

Kamalian, A., Yaghoubi, N. &Poori, M. (2011). Emotional intelligence and corporate entrepreneurship: An empirical study. *Journal of Basic and Applied Scientific Research*, 1(6), 471-478.

Three to Five Authors

Elements of the reference

Author(s) of journal article - family name and initials, use & for multiple authors. (Year of publication). Title of journal article. Journal name - italicised, Volume - italicised(Issue or number), Page number(s). doi:xx.xxxxxxxxxx

Humphrey, N., Curran, A., Morris, E., Farrell, P., & Woods, K. (2007). Emotional intelligence and education: A critical review. *Educational Psychology*, 27(2), 235-254. doi:10.1080/01443410601066735.

Seven or More Authors & DOI (Electronic or Print)

Elements of reference

Author's Last Name, First Initial. Second Initial. (repeat for next five authors)... & Last Author's Name, First Initial. Second Initial. (Year). Article title: Subtitle. Journal Title, Volume(issue), page range. doi:xx.xxxxxxxxxx

Perera, K. S., Vanassche, T., Bosch, J., Swaminathan, B., Mundl, H., Giruparajah, M., ... & Yoon, B. W. (2016). Global survey of the frequency of atrial fibrillation-associated

stroke embolic stroke of undetermined source global registry. *Stroke*, 47(9), 2197-2202.
doi: <http://dx.doi.org/10.1161/STROKEAHA.116.013378>

Magazine Articles

Print Magazine

- Author, A.A. (2002, Month day). Title of article. Title of Magazine, volume (if any), page -number/s
- Sinha, C (2023, October 30). Retelling the Epic of Ramayana. *Outlook*, 10, 10-12.

Online Magazine

- Author, A.A. (2002, Month day). Title of article. Title of Magazine, volume (if any), page -number/s. Retrieved from statement.

Newspaper

- Author, A.A. (2003/7, Month day). Title of article. Title of Newspaper p./pp., pagenumber/s
- Chapman, M. & Clarke, R.C (2003,January). Emotional intelligence is a concept that can be used in stress management: A response to Slaski. *Stress News*, 15(1).

Ph.D Thesis

Elements of the reference

Author, A. A. (Year). Title of doctoral dissertation (Doctoral dissertation). Retrieved from/ Available from Name of database. (Accession or Order number)

Bharti, R. (2012). A study of certain cognitive and non-cognitive variables in relation to emotional intelligence of student teachers (Doctoral thesis). Retrieved from <http://hdl.handle.net/10603/29724>

Author, A. A. (Year of publication). Title of thesis or dissertation (Unpublished Doctoral dissertation or master's thesis). Name of Institution, Location.

Jerath, J.M. (1979). A study of achievement motivation and its personality motivation and ability correlates. (Unpublished Doctoral thesis). Panjab University, Chandigarh.

MLA STYLE

Modern Language Association (MLA) Style, 8th edition The MLA citation style is most commonly used in the liberal arts and humanities fields. The following discussion is based on the Modern Language Association handbook: *MLA Handbook*, 9th Edition. It is not meant to serve as a substitute for the handbook but as an overview of the most common formatting guidelines adopted from *A Short Guide to MLA Format* (Ninth Edition), The College of Saint Rose Writing Center.

Basic Book Format

The basic form for a book citation is:

Last Name, First Name. Title of Book. City of Publication, Publisher, Publication Date.

*Note: the City of Publication should only be used if the book was published before 1900, if the publisher has offices in more than one country, or if the publisher is unknown outside North America.

Book with One Author

Gleice, James. *Chaos: Making a New Science*. Penguin, 1987.

Henley, Patricia. *The Hummingbird House*. MacMurray, 1999.

Book with More Than One Author

When a book has multiple authors, order the authors in the same way they are presented in the book. The first given name appears in "last name, first name" format; subsequent author names appear in "first name, last name" format.

Gillespie, Paula, and Neal Lerner. *The Allyn and Bacon Guide to Peer Tutoring*. Allyn and Bacon, 2000.

If there are three or more authors, list only the first author followed by the phrase *et al.* (Latin for "and others") in place of the subsequent authors' names. (Note that there is a period after "al" in "et al." Also note that there is never a period after the "et" in "et al.").

Wysocki, Anne Frances, et al. *Writing New Media: Theory and Applications for Expanding the Teaching of Composition*. Utah State UP, 2004.

Two or More Books by the Same Author

List works alphabetically by title. (Remember to ignore articles like A, An, and The) Provide the author's name in last name, first name format for the first entry only. For each subsequent entry by the same author, use three hyphens and a period.

Palmer, William J. Dickens and New Historicism. St. Martin's, 1997.

---. The Films of the Eighties: A Social History. Southern Illinois UP, 1993. Periodicals

Periodicals include magazines, newspapers, and scholarly journals. Works cited entries for periodical sources include three main elements—the author of the article, the title of the article, and information about the magazine, newspaper, or journal. MLA uses the generic term "container" to refer to any print or digital venue (a website or print journal, for example) in which an essay or article may be included.

Use the following format for all citations:

Author. Title. Title of container (self-contained if book), Other contributors (translators or editors), Version (edition), Number (vol. and/or no.), Publisher, Publisher Date, Location (pp.).

2nd container's title, Other contributors, Version, Number, Publisher, Pub date, Location.

Article in a Magazine

Cite by listing the article's author, putting the title of the article in quotations marks, and italicizing the periodical title. Follow with the date of publication. Remember to abbreviate the month. The basic format is as follows:

Author(s). "Title of Article." Title of Periodical, Day Month Year, pages.

Buchman, Dana. "A Special Education." *Good Housekeeping*, Mar. 2006, pp. 143-48.

Poniewozik, James. "TV Makes a Too-Close Call." *Time*, 20 Nov. 2000, pp. 70-71.

Article in a Newspaper

Cite a newspaper article as you would a magazine article but note the different pagination in most newspapers. If there is more than one edition available for that date (as in an early and late edition of a newspaper), identify the edition after the newspaper title.

Brubaker, Bill. "New Health Center Targets County's Uninsured Patients." *Washington Post*, 24 May 2007, p. LZ01.

Krugman, Andrew. "Fear of Eating." *New York Times*, late ed., 21 May 2007, p. A1.

If the newspaper is a less well-known or local publication, include the city name in brackets after the title of the newspaper.

Trembacki, Paul. "Brees Hopes to Win Heisman for Team." *Purdue Exponent* [West Lafayette, IN], 5 Dec. 2000, p. 20.

A Review

To cite a review, include the title of the review (if available), then the phrase, "Review of" and provide the title of the work (in italics for books, plays, and films; in quotation marks for articles, poems, and short stories). Finally, provide performance and/or publication information.

Review Author. "Title of Review (if there is one)." *Review of Performance Title*, by Author/Director/Artist. *Title of Periodical*, Day Month Year, page.

Seitz, Matt Zoller. "Life in the Sprawling Suburbs, If You Can Really Call It Living." *Review of Radiant City*, directed by Gary Burns and Jim Brown. *New York Times*, 30 May 2007, p. E1.

An Article in a Scholarly Journal

A scholarly journal can be thought of as a container, as are collections of short stories or poems, a television series, or even a website. A container can be thought of as anything that is a part of a larger body of works. In this case, cite the author and title of article as you normally would. Then, put the title of the journal in italics. Include the volume number ("vol.") and issue number ("no.") when possible, separated by commas. Finally, add the year and page numbers.

Author(s). "Title of Article." *Title of Journal*, Volume, Issue, Year, pages.

Bagchi, Alaknanda. "Conflicting Nationalisms: The Voice of the Subaltern in Mahasweta Devi's *BashaiTudu*." *Tulsa Studies in Women's Literature*, vol. 15, no. 1, 1996, pp. 41-50.

Duvall, John N. "The (Super)Marketplace of Images⁴: Television as Unmediated Mediation in

DeLillo's *White Noise*." *Arizona Quarterly*, vol. 50, no. 3, 1994, pp. 127-53.

The Chicago Manual of Style (CMS STYLE)

The Chicago Manual of Style is an American English style guide published by the University of Chicago Press since 1906. It is used widely in many academic disciplines and is considered the standard for US style in book publishing. Chicago-style source citations come in two varieties: (1) notes and bibliography and (2) author-date.

- 1. Notes and bibliography System:** The notes and bibliography system is preferred by many working in the humanities-including literature, history, and the arts. In this system, sources are cited in numbered footnotes or endnotes. Each note corresponds to a raised (superscript) number in the text. Sources are also usually listed in a separate bibliography. The notes and bibliography system can accommodate a wide variety of sources, including unusual ones that don't fit neatly into the author-date system.
- 2. Author-Date System:** The author-date system is more common in the sciences and social sciences. In this system, sources are briefly cited in the text, usually in parentheses, by author's last name and year of publication. Each in-text citation matches up with an entry in a reference list, where full bibliographic information is provided.

The following discussion is adopted from Chicago-Style Citation Quick Guide and the author-date system is emphasised for citation purpose.

Book

Reference list entries (in alphabetical order)

Grazer, Brian, and Charles Fishman. 2015. *A Curious Mind: The Secret to a Bigger Life*. New York: Simon & Schuster.

Smith, Zadie. 2016. *Swing Time*. New York: Penguin Press.

Chapter or other part of an edited book

In the reference list, include the page range for the chapter or part. In the text, cite specific pages.

Reference list entry

Thoreau, Henry David. 2016. "Walking." In *The Making of the American Essay*, edited by John D'Agata, 167-95. Minneapolis: Graywolf Press.

In some cases, you may want to cite the collection as a whole instead.

Reference list entry

D'Agata, John, ed. 2016. *The Making of the American Essay*. Minneapolis: Graywolf Press.

Translated book

Reference list entry

Lahiri, Jhumpa. 2016. *In Other Words*. Translated by Ann Goldstein. New York: Alfred A. Knopf.

E-book

For books consulted online, include a URL or the name of the database in the reference list entry. For other types of e-books, name the format. If no fixed page numbers are available, cite a section title or a chapter or other number in the text, if any (or simply omit).

Reference list entries (in alphabetical order)

Austen, Jane. 2007. *Pride and Prejudice*. New York: Penguin Classics. Kindle.

Borel, Brooke. 2016. *The Chicago Guide to Fact-Checking*. Chicago: University of Chicago Press. ProQuestEbrary.

Kurland, Philip B., and Ralph Lerner, eds. 1987. *The Founders' Constitution*. Chicago: University of Chicago Press. <http://press-pubs.uchicago.edu/founders/>.

Melville, Herman. 1851. *Moby-Dick; or, The Whale*. New York: Harper & Brothers. <http://mel.hofstra.edu/moby-dick-the-whale-proofs.html>.

Journal article

In the reference list, include the page range for the whole article. In the text, cite specific page numbers. For articles consulted online, include a URL or the name of the database in the reference list entry. Many journal articles list a DOI (Digital Object Identifier). A DOI forms a permanent URL that begins <https://doi.org/>. This URL is preferable to the URL that appears in your browser's address bar.

Reference list entries (in alphabetical order)

Keng, Shao-Hsun, Chun-Hung Lin, and Peter F. Orazem. 2017. "Expanding College Access in Taiwan, 1978-2014: Effects on Graduate Quality and Income Inequality." *Journal of Human Capital* 11, no. 1 (Spring): 1-34. <https://doi.org/10.1086/690235>.

LaSalle, Peter. 2017. "Conundrum: A Story about Reading." *New England Review* 38 (1): 95-109. Project MUSE.

Satterfield, Susan. 2016. "Livy and the Pax Deum." *Classical Philology* 111, no. 2 (April): 165-76.

Journal articles often list many authors, especially in the sciences. If there are four or more authors, list up to ten in the reference list; in the text, list only the first, followed by et al. ("and others"). For more than ten authors (not shown here), list the first seven in the reference list, followed by et al.

Reference list entry

Bay, Rachael A., Noah Rose, Rowan Barrett, Louis Bernatchez, Cameron K. Ghalambor, Jesse R. Lasky, Rachel B. Brem, Stephen R. Palumbi, and Peter Ralph. 2017. "Predicting Responses to Contemporary Environmental Change Using Evolutionary Response Architectures." *American Naturalist* 189, no. 5 (May): 463-73. <https://doi.org/10.1086/691233>.

News or magazine article

Articles from newspapers or news sites, magazines, blogs, and the like are cited similarly. In the reference list, it can be helpful to repeat the year with sources that are cited also by month and day. Page numbers, if any, can be cited in the text but are omitted from a reference list entry. If you consulted the article online, include a URL or the name of the database.

Reference list entries (in alphabetical order)

Manjoo, Farhad. 2017. "Snap Makes a Bet on the Cultural Supremacy of the Camera." *New York Times*, March 8, 2017. <https://www.nytimes.com/2017/03/08/technology/snap-makes-a-bet-on-the-cultural-supremacy-of-the-camera.html>.

Mead, Rebecca. 2017. "The Prophet of Dystopia." *New Yorker*, April 17, 2017.

Pai, Tanya. 2017. "The Squishy, Sugary History of Peeps." *Vox*, April 11, 2017. <http://www.vox.com/culture/2017/4/11/15209084/peeps-easter>.

Pegoraro, Rob. 2007. "Apple's iPhone Is Sleek, Smart and Simple." *Washington Post*, July 5, 2007. LexisNexis Academic.

Book review

Reference list entry

Kakutani, Michiko. 2016. "Friendship Takes a Path That Diverges." Review of *Swing Time*, by Zadie Smith. *New York Times*, November 7, 2016.

Interview

Reference list entry

Stamper, Kory. 2017. "From 'F-Bomb' to 'Photobomb,' How the Dictionary Keeps Up with English." Interview by Terry Gross. *Fresh Air*, NPR, April 19, 2017. Audio, 35:25. <http://www.npr.org/2017/04/19/524618639/from-f-bomb-to-photobomb-how-the-dictionary-keeps-up-with-english>.

Thesis or dissertation

Reference list entry

Rutz, Cynthia Lillian. 2013. "King Lear and Its Folktale Analogues." PhD diss., University of Chicago.

Website content

It is often sufficient simply to describe web pages and other website content in the text ("As of May 1, 2017, Yale's home page listed . . ."). If a more formal citation is needed, it may be styled like the examples below. For a source that does not list a date of publication

or revision, use n.d. (for "no date") in place of the year and include an access date.

Reference list entries (in alphabetical order)

Bouman, Katie. 2016. "How to Take a Picture of a Black Hole." Filmed November 2016 at TEDxBeaconStreet, Brookline, MA. Video, 12:51. https://www.ted.com/talks/katie_bouman_what_does_a_black_hole_look_like.

Google. 2017. "Privacy Policy." Privacy & Terms. Last modified April 17, 2017. <https://www.google.com/policies/privacy/>.

Yale University. n.d. "About Yale: Yale Facts." Accessed May 1, 2017. <https://www.yale.edu/about-yale/yale-facts>.

Social media content

Citations of content shared through social media can usually be limited to the text (as in the first example below). If a more formal citation is needed, a reference list entry may be appropriate. In place of a title, quote up to the first 160 characters of the post. Comments are cited in reference to the original post.

Text

Conan O'Brien's tweet was characteristically deadpan: "In honor of Earth Day, I'm recycling my tweets" (@ConanOBrien, April 22, 2015).

Reference list entries (in alphabetical order)

Chicago Manual of Style. 2015. "Is the world ready for singular they? We thought so back in 1993." Facebook, April 17, 2015. <https://www.facebook.com/ChicagoManual/posts/10152906193679151>.

Souza, Pete (@petesouza). 2016. "President Obama bids farewell to President Xi of China at the conclusion of the Nuclear Security Summit." Instagram photo, April 1, 2016. <https://www.instagram.com/p/BDrmfXTtNCt/>.

Check Your Progress-1

Note: (a) Write your answers in the space given below.

(b) Compare your answers with those given at the end of the lesson/above sub-section.

1. Fill in the blanks

- (i) A _____ should contain all the key elements involved in the research process.
- (ii) Title is basically the _____ of the topic of the research study.
- (iii) Statement of the problem is an _____ of the title.
- (iv) Researcher should prepare a _____ for carrying out the research effectively.
- (v) The MLA citation style is most commonly used in the _____ and _____ fields.

2. Enumerate the steps followed in preparing research proposal.

3. Write the basic features of APA style of writing a Research Proposal.

4. Write the basic features of MLA style of writing a Research Proposal.

15.5 LET US SUM UP

Writing a research proposal is a challenging task due to the constantly evolving trends in the field of research. A researcher is required to have a detailed understanding of various styles of writing an appropriate research proposal. A well written research proposal should communicate the researcher's knowledge of the field. It should follow a discernible

logic from the introduction to presentation of the appendices. Moreover, different citation styles like MLA, APA, Chicago, and Harvard are used for bibliography and references. However, MLA, APA, and Chicago are by far the most commonly used by high school and college students.

15.6 LESSON END EXERCISE

1. Discuss the steps of preparing a Research Proposal.
2. Elaborate the APA style of writing a Research Proposal.
3. Illustrate MLA style of writing a Research Proposal.
4. Explain CMS style of writing a Research Proposal

15.7 SUGGESTED FURTHER READINGS

1. Freedman, P. (1960): Principles of Scientific Research. New York: Public Affairs Press.
2. Kerlinger, F. N (2004). Foundation of Behavioral Research, New Delhi: Surjeet Publications.
3. Sidhu, K. S. (1984). Fundamentals of Research in Education, New Delhi: Sterling publishers Pvt. Ltd.
4. Vijay, U. and Arvind, S (2010). Research Methodology. New Delhi: S. Chand & Company Pvt. Ltd.
5. Mishra, R.P.(2002.) Research Methodology. New Delhi: Concept Publishing Company.
6. Sansanwal, D.N. (2020). Research Methodology and Applied Statistics. Delhi: Shipra Publications.
7. Kothari, C.R. and Garg, G. (2019). Research Methodology: Methods and Techniques. New Delhi: New Age International (P) Limited, Publishers.
8. Chandra, S.S. and Sharma, R.K. (2007), Research in Education. New Delhi: Atlantic Publishers & Distributors (P) Ltd.

9. Good, C.V. (2016). Introduction to Educational Research. Delhi: Surjeet Publications.
10. Pandya, S. R. (2021). Educational Research. New Delhi: A P H Publishing Corporation.
11. Koul, L (2019). Methodology of Educational Research. Noida, U.P.:Vikas Publishing House

15.8 ANSWERS TO CHECK YOUR PROGRESS

- (i) research proposal
- (ii) name
- (iii) expansion
- (iv) time-schedule
- (v) liberal arts and humanities

MASTER'S DEGREE PROGRAMME IN EDUCATION (M.A. EDUCATION)
CHOICE BASED CREDIT SYSTEM
SEMESTER - I

Syllabus for the Examination to be held in December 2023, 2024 and 2025

Course No. PSEDTC104	Title : Introduction to Educational Research
Credits : 4	Maximum Marks : 100
	Minor Test - I : 10
	Minor Test-II : 10
	Internal Assessment Assignment 10
	Major Test : 70

Learning Outcomes :

1. Students will be oriented about research and its application in the field of education.
2. Students will understand various types of educational research.
3. Students will be able to select research problem.
4. Students will understand various sampling techniques used in educational research.
5. Students will be able to prepare a research proposal

Course Contents :

Unit - I

Educational Research

- Meaning, nature and scope
- Need and Purpose
- Areas of Educational Research : Philosophical, Psychological and Sociological
- Types of Educational Research - Fundamental, Applied and Action Research (Meaning, Purpose, Steps, Characteristics and Differences)
- Scientific enquiry and theory development

Unit - II

Research Problem

Selection (Problems and its sources)

- Evaluation (Criteria)
- Delineating and operationalizing variables Review of Related Literature : Meaning and Importance Hypothesis : Meaning, Sources and Types Characteristics of a good Hypothesis Importance, Difference between Assumption and Hypothesis

MASTER'S DEGREE PROGRAMME IN EDUCATION (M.A. EDUCATION)
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Credits : 4	Maximum Marks : 100
	Minor Test - I : 10
	Minor Test-II : 10
	Internal Assessment Assignment 10
	Major Test : 70

Unit - III

Population and Sample

- Concept of Population, Sample
- Characteristics of a good sample
- Techniques of Sampling : Probability and Non-Probability

Probability Sampling : Simple random, Systematic random, Cluster, Stratified and Multi-stage Sampling, Non-Probability Sampling : Purposive, Quota, Incidental sampling

Course Contents :

Unit - IV

Research Proposal

Meaning, Importance and Writing style Steps of Preparing Research Proposal

Style of writing Bibliography (APA, MLA and CMS)

Modes of Transaction : Lecture-cum-discussion, project and method and practical

Note for paper setting :

There shall be two tests & one Assignment as part of Minor Evaluation & one major test at the end of semester in each semester. The student shall be continuously evaluated during the conduct of each course on the basis of their performance as follows :

Theory	Syllabus to be covered in the examination	Time allotted for the examination	% weightage (marks)
Minor Test-I	Unit I & Unit II	Sixty Minutes	10 Marks
Minor Test-II	Unit I & Unit II	Sixty Minutes	10 Marks
IAA			10 mark (two questions of 5 marks each)
Major Test	Unit I to IV	Three Hours	70 marks

MASTER'S DEGREE PROGRAMME IN EDUCATION (M.A. EDUCATION)
CHOICE BASED CREDIT SYSTEM
SEMESTER - I

Syllabus for the Examination to be held in December 2023, 2024 and 2025

Course No. PSEDTC104R	Title : Introduction to Educational Research
Credits : 4	Maximum Marks : 100
	Minor Test - I 10
	Minor Test-II : 10
	Internal Assessment Assignment 10
	Major Test : 70

Essential Readings :

1. Anastasi, Annie (1997). Psychological, Prentice Haall.
2. Best, J.W. (2005), Research in Education Person.
3. Freeman, Frank, S. (1953) Theory and practice of Psychological Testing Holt
4. Good, C.V. (1971). The Methodology of Educational Research, New York.
5. Hayman, J.L (1966). Research in Education. Ohio

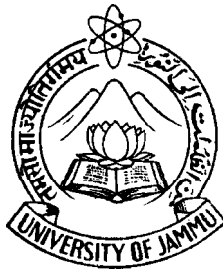
Suggested Readings :

6. Mouly, G.J. (1978). The Science of Education Research. Boston.
7. Sukhia & Mehrotra (1966) Introduction to Educational Research Bombay.
8. Travers, M.W.R. (1969) Introduction to Educational Research Macmillan & Co.

Note for Paper Setters (Major Type)

The question paper will contain long and short answer type questions. There will be total of eight long answer type questions (two questions from each unit with internal choice) and the candidates will be required to answer one question from each unit. Each long answer type question will carry 5 marks. Question No. 1 will be compulsory and shall have 04 short answer type questions (100 words per question). Short answer type questions will be from all the units. Each short answer type question will carry 2.5 marks.

DIRECTORATE OF DISTANCE & ONLINE EDUCATION
UNIVERSITY OF JAMMU
JAMMU



SELF LEARNING MATERIAL
M.A. EDUCATION
SEMESTER - I

Subject : Introduction to Educational Research

Unit : I - IV

Course No. : 104

Lesson No. : 1 - 15

Dr. Anuradha Goswami
Course Co-ordinator

<http://www.distanceeducationju.in>

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INTRODUCTION TO EDUCATION

Course Contributors :

- Dr. Maansi Sharma
Assistant Professor
Govt. College of Education, Jammu
- Mr. Rakesh Bharti
Assistant Professor
GDC Jourian, Jammu
- Dr. Pawan
Assistant Professor (Contractual)
Deptt. of Statistics
University of Jammu, Jammu
- Mr. M.M. Mattoo
Assistant Professor
GDC Kishtwar, Jammu

Format Editing by :

Dr. Anuradha Goswami
DD&OE, University of Jammu

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