EDUCATIONAL RESEARCH: MEANING, TYPES, SCOPE AND LIMITATION

Structure

1.1 Objectives

After completing this unit you will be able to:

- identify main sources of knowledge
- define educational research
- discuss the significant of different types of educational research
- describe the scope of educational research
- explain the limitations of educational research

1.2. Sources of Knowledge

The ways in which human beings have sought knowledge throughout history can be categorized under five headings:

1.2.1   Experience

Experience is certainly one of the fundamental ways we come to know about and understand our world. For example, a child who touches something hot learns that high heat hurts.

1.2.2   Authority

Authority is people seek knowledge from someone who has had experience with the problem or has some other source of expertise. People accept as truth the word of recognized authorities. A

student can look up the accepted pronunciation of a word in a dictionary. A beginning teacher asks an experienced one for suggestions and may try a certain technique for teaching reading because the teacher with experience suggests that it is effective.

1.2.3   Deductive reasoning

Aristotle and his followers introduced the use of deductive reasoning. Deductive reasoning can be described as a thinking process in which one proceeds from general to specific knowledge through logical argument. It involves essentially the reverse process—arriving at specific conclusions based on general principles, observations, or experiences (i.e., generalizations).

For example

Observations: Every mammal has lungs.

All rabbits are mammals.

Generalization: Therefore, every rabbit has lungs.

1.2.4   Inductive reasoning

Francis Bacon was first called for a new approach to knowing i.e., Inductive reasoning. It involves developing generalizations based on observation of a limited number of related events or experiences.

For Example

Observations: Every rabbit that has ever been observed has lungs.

Generalization: Therefore, every rabbit has lungs.

1.2.5   The scientific approach

People found that many problems could not be solved by induction alone. In the 19th century, scholars began to integrate the most important aspects of the inductive and deductive methods into a new technique, namely the inductive–deductive method, or the scientific approach. This approach differs from inductive reasoning in that it uses hypotheses. A hypothesis is a statement describing relationships among variables that is tentatively assumed to be true. It identifies observations to be made to investigate a question.

The scientific approach is generally described as a method of acquiring knowledge in which investigators move inductively from their observations to hypotheses and then deductively from the hypotheses to the logical implications of the hypotheses. They deduce the consequences that would follow if a hypothesized relationship were valid. If the deduced implications are compatible with the organized body of accepted knowledge, researchers then further test them by gathering empirical data. On the basis of the evidence, they accept or reject the hypotheses.

For example, a researcher interested in increasing student on-task behavior might hypothesize that positive teacher feedback increases on-task behavior. All hypotheses indicate specific phenomena to be observed (the variables), in this case positive teacher feedback and on-task behavior.

The scientific method is an orderly process entailing a number of steps: recognition and definition of a problem; formulation of hypotheses; collection of data; analysis of data; and statement of conclusions regarding confirmation or disconfirmation of the hypotheses (i.e., a researcher forms a hypothesis—an explanation for the occurrence of certain behaviors, phenomena, or events—as a way of predicting the results of a research study and then collects data to test that prediction). These steps can be applied informally to solve such everyday problems.

The more formal application of the scientific method is standard in research; it is more efficient and more reliable than relying solely on experience, authority, inductive reasoning, and deductive reasoning as sources of knowledge.

1.3 Research

Research is difficult to define. It is not enough to say research is what researchers do. Too many people misuse the word. For Example, some faculty colleagues claim to do research to prepare for a class, every week, no less. What they usually mean is they read or reread material that they

will be presenting or discussing in class. Such a preparation may take time and effort, but it is not research.

Students frequently are assigned research papers, wherein they read from books and journals, usually in a library and synthesize the material to form the research paper. The student would claim to be doing research or at least library research. What they are doing in searching or reviewing the literature on a topic and writing about their findings. It is not research.

A journalist may systematically investigate an occurrence to find out way it happened, and the same journalist may indeed claim that what he or she is doing is research, but it is not. It is Journalism.

Research is an activity that makes an impact on theory. In the absence of theory, the activity is not research. The activity may be preparing for a class, writing a paper, or developing a story, all honorable activities, but they are not research unless they have a connection with something theoretical.

Research is the formal, systematic application of the scientific method to the study of problems. Research is considered to be more structured and systematic process of carrying out a scientific method of analysis that is directed towards discovery and development of an organized body of knowledge. It is planned activity to obtain answers to meaningful questions about phenomena or events through the application of scientific approach. Research is an objective, empirical and logical analysis and recording of controlled observations that may lead to the development of generalizations, principles of theories, resulting to some extent in prediction and control of events that may be consequences or cause of specific phenomena. Research is scientific as such is not satisfied with isolated facts, but seeks to integrate and systematize its findings.

1.4 Educational research

Educational research is the formal, systematic application of the scientific method to the study of educational problems. . Educational research is the way in which people acquire dependable and useful information about the educative process. Educators usually conduct research to find a solution to some problem or to gain insight into an issue they do not understand. The ultimate goal is to discover general principles or interpretations of behavior that people can use to explain, predict, and control events in educational situations—in other words, to formulate scientific theory.

Definitions

1. Good - "Educational research is the study and investigation in the field of education."
2. Munroe - "The final purpose of educational research is to ascertain principles and develop procedures for use in the field of education."

3. Mulay - "Any systematic study designed to promote the development of education as a science can be considered educational research."
4. Crawford - "Educational research is a systematic and refined technique of thinking, using special tools in order to obtain a mere adequate solution of a problem."
5. J. W. Best - "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."
6. W. M. Traverse - "Educational research is that activity which is directed towards the development of science of behavior in educational situations."

Characteristics

1. Educational research is directed towards the solution of a problem in the field of education. It may attempt to answer a question or to determine the relation between two or more variables.
2. It emphasizes the development of generalizations, principles or theories that will be helpful in predicting future occurrences.
3. Educational research usually goes beyond the specific objects, groups or situations investigated and infer characteristics of a target population from the sample observed.
4. Educational research involves getting new data from primary or firsthand sources or using existing data for a new purpose.
5. Educational research accepts only what can be verified by observation. Certain interesting questions do not tend themselves to research procedures.
6. Although research activity may at times be somewhat random and unsystematic, it is more often characterized by carefully designed procedures, always applying rigorous analysis. Although trial and error are often involved, research is rarely a blind, shotgun investigation trying something to see what happens.
7. Research strives to be objective and logical, applying every possible test to validate the procedures employed, the data collected and the conclusions reached. The researcher attempts to eliminate personal bias.
8. Research requires expertise. The researcher knows what is already known about the problem and how others have investigated.
9. Educational research involves the quest for answers to unsolved problems. Pushing back the frontiers of ignorance is its goal and originality is frequently the quality of a good research project.
10. Educational research is based on insight and imagination. It needs the service of man who looks beyond the present. Educational research requires interdisciplinary approach. It is related to the study of complex relations about facts.
11. Educational research is not so exact a research as physical science. In the latter we can control the events but in educational research it is not possible.

12. Educational research has a great field. Educational psychology, educational philosophy, methodology, class organization and management, child development and other subjects are the fields of research in education.

1.5 Need and importance

Research in education as in the 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 need for research in education.

1. Education has strong roots in the field like philosophy, history, economics, psychology and sociology. It is through an intensive process of scientific inquiry about the philosophical, historical, economics, psychological and sociological impact on various aspects of education that sound theories can be established.

2. Education is considered as much a science as an art. As a science, it has a corpus of knowledge. Since education depends on a corpus of knowledge, there is need to add scientific knowledge to it for enrichment and improvement. As an art, education seeks to impart knowledge effectively. For example, 'How can the teacher play an effective role in the classroom and outside?' is a vital question before educationists. It needs careful research efforts to enhance teacher's effectiveness.

3. The slogan of democratization of education resulted in the expansion of education. It has given rise to numerous problems like the problem of individual differences, expansion, buildings, discipline and so on. Solutions of such problems by trial and error or by experience from tradition and authority often yielded erroneous result. 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.

4. There is a need for educational research because of the changing concept 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 beings, who thereby learns 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 the 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 ne 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.

5. 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 important 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.

1.6 Types of Educational Research

Generally research is defined into three types

    1.6.1   Basic Research
    1.6.2   Applied Research
    1.6.3   Action Research

1.6.1 Basic research

Basic research is research, aimed at obtaining empirical data used to formulate and expand theory. Basic research is not oriented in design or purpose toward the solution of practical problems. This research also termed as fundamental and pure research. Its essential aim is to expand the frontiers of knowledge without regard to practical application. Much early

psychological investigation of reinforcement was basic research. Later, social scientists found that the reinforcement theory resulting from that research had educational applications. The findings of Basic research have universal validity.

Basic research is characterized by high quality research designs and sophisticated techniques involving originality, imagination and inventiveness. Its methodology is rigorous involving high structured, intensive and systematic scientific processes. It employs careful sampling techniques in order to extend the findings beyond the selected sampled groups and draws broad generalizations or principles leading to development of theories.

1.6.2 Applied Research

Applied research aims to solve an immediate practical problem. It is research performed in relation to actual problems and under the conditions in which they appear in practice. Through applied research, educators can often solve their problems at the appropriate level of complexity —that is, in the classroom teaching–learning situation. Although applied research may solve some specific question, it may not provide the general knowledge to solve other problems. For example, an elementary school teacher may study the effect of a new method of teaching fractions. She or he conducts the research to answer a practical question, not necessarily to make broad generalizations or to help develop a theory.

This classification of research is not always distinct, however, because there are varying degrees on the basic–applied continuum. Research along this basic– applied dimension is usually classified on the degree to which the findings are directly applicable to solving a practical problem. Basic research often has practical benefits in the long term. For example, advances in the practice of medicine depend on basic research in biochemistry, microbiology, and genetics. Likewise, progress in educational practice is related to progress in discovering general laws through basic psychological, educational, and sociological research.

Actually, in recent years basic and applied research has tended to merge in education and psychology. The trend has been for basic research to move more toward classroom studies because the findings of applied research may help basic researchers' complete theoretical formulations. Researchers developing general theories of learning, for example, often go into classrooms because to understand how children learn investigators must consider variables such as context and social structure that are not present in the artificial environments of the laboratory. Once the theories are formulated, they can be tested through further research in the classroom.

1.6.3 Action Research

Action research in education is any systematic inquiry conducted by teachers, principals, school counselors, or other stakeholders in the teaching– learning environment to gather information about the ways in which their particular schools operate, the teachers teach, and the students learn. Its purpose is to provide teacher-researchers with a method for solving everyday problems

in their own settings. The goal of action research in education is to create an inquiry stance toward teaching where questioning one's own practice becomes part of the work and of the teaching culture. Action Research is:-

- A process to improve education by incorporating change and involves educators working together to improve their own practice.
- Persuasive and authoritative because it is done by and for educators.
- Collaborative and encourages educators working and talking together in empowering relationships, including educators as integral, participating members of the process.
- Practical and relevant and allows educators direct access to research findings.
- A way to develop critical reflection and open-mindedness
- A planned, systematic, and cyclical approach to understanding the learning process and to analyzing educational places of work.
- A justification on one's teaching practices.

Classification of research

Basic research	Applied research	Action research
Fundamental, pure, complete research	Field research	Spot research
Aims at discovering basic truths and principles	Concerned with establishing relationship and testing theories in the field setting	Involves application of scientific methods to classroom problems
Builds up broad generalizations, principles and theories of education	Also applying the same to other samples of the population	Projects are carried out in a single classroom by a single teacher or by all teachers in a school or even a school district
Results in discovery of useful concepts	Already discovered facts, knowledge, principles and are put to application in educational settings	Aims at studying the problems scientifically in order to guide, correct and evaluate educational practice

1.7 Scope of Educational Research

Followings are the scope of Educational Research

1. **Educational Philosophy**

Education is the dynamic side of philosophy. Promising field of research in philosophy of education include the following areas: Aims of education, the motivation of learning, the measurements, its results, the construction of curriculum etc. A study of the sayings and philosophy of life of Vivekananda, Aurobindo, Tagore, Gandhi, Dewey, Plato etc. a philosophical analysis of the problems of indiscipline, unrest, strikes, disobedience of authority etc. are the major areas of research in philosophy of education. Research in this field can provide following information:-

- Role of knowledge, beliefs, values in developing educational theories.
- Role of ideologies and religion for improving educational practices.
- Development of a practical philosophy in the Indian context.
- Discovering new implications of ancient Indian philosophies in the present scenario.
- Determining the contribution of various Indian philosophers and their implications at present.
- Role of logic in various areas of education from concept information to theory development.

2. **Educational Sociology**

With the increasing stress on sociological foundations of education, the interface of the two disciplines of education and sociology is getting attention of Indian researchers more and more. Various dimensions of Research in this field are given below:-

- Effect of changes in demographic structure of education.
- Effect of new education policy on expansion of education and employment.
- Role of educational institutions in bringing about social change and vice versa.
- Role of social and cultural factors in bringing about social and educational equity.
- Role of teachers as agent of social change, modernization and social equity.
- Education in disadvantaged section of the society.
- Minorities and their problem.

3. **Educational Psychology**

Research in Educational Psychology has great importance for a teacher. The expediency of various theories of learning for designing conditions that produce effective learning in school has

been the central theme of researches. Promising fields of research in Educational Psychology include: Cognitive, non-cognitive factors such as intelligence, aptitudes, creativity, attitudes, interest, motivation, personality traits, needs and adjustment of pupils, various influences of home, neighborhood, peer relationships and other social relationships that influences child development, growth and learning are worth investigating. This research provides the following information:-

- Usefulness of learning theories in various educational settings.
- Relative effectiveness of various learning theories via field experiments.
- Identification of factors conducive to learning.
- Role of physical/intellectual inefficiencies and defects in learning.
- Understanding the personality of children in the class.
- Effects of parental and teachers attitude toward children on learning.

4. Educational Management and Administration

Research in this field can help us understand the following aspects:-

- Problems on educational administration in India and its impact on performance of students.
- Impact of educational planning and legislations on the performance of the students.
- Development of management theories and their implications on educational institutions.
- Impact on recruitment policies on output.
- Supervision and performance.
- Contribution of NGOs to education.
- Effect of liberalization and privatization of higher education in India.
- Quality management of educational institutions.

5. Curriculum Development

A school curriculum will be efficient if it is based on sufficient knowledge of how children grow and learn and of the requirements of the modern society. The latter is a matter of public relations and the former of research. Nature and scope of research in this field can be understood by the following topics:-

- Structure of curriculum in India from primary to higher level.
- Analysis and organization of curriculum in various subjects.
- Curriculum in relation to needs of the learner and the society.
- Analysis of text books at different stages of learning.
- Inculcation of national values through curriculum development.

6. Educational Technology

The major areas of educational technology are: software approach, hardware approach and systems approach and their impact on the learning of students, programmed instruction, use of science and technology to improve the teaching learning process, communication and media, audio visual aids, teaching machines, projectors and computers. The comparative gains of face to face instruction and televised instruction in teaching of different subjects may include in the field of research studies. Research in this field contributes in the:-

- Development of new teaching strategies by action researches.
- Role of technology in teaching learning process.
- Application of technological equipment and laws in education.
- Development of new audio visual aids.

7. Educational Measurement and Evaluation

This may include the following areas like construction and standardization of various tests including the achievement ones. Problems relating to pupil assignment, judgment, corrective programmes, norms, psychological tests, observational techniques, rating scales, groups test of intelligence and aptitude, personality tests etc. Research in this field can help us understand the following aspects:-

- Problems relating to pupil assignment.
- Development of new techniques of assessment.
- Attitude of teachers towards Continuous Comprehensive Evaluation.
- Impact of CBCS in students learning process.
- Introduction of new Criteria for evaluation.

8. Guidance and Counseling

Research in this field helps us to understand the following aspects of education:-

- Construction of tools for diagnosing adjustment problems of students.
- Methodology of vocational guidance for children belonging to different strata of society.
- Identification of factors contributing to success in the life of students.
- Adaptation of foreign tests and inventories to Indian situations.

9. Comparative Education

The research in this area includes analyzing the educational organization and administrative machinery of two or more countries. Research in this field helps us understand the following aspects of education:-

- Administrative and educational policies of different countries and their impact on society as a whole.
- Impact of various systems of education in the world on each other.
- Comparison of educational progress in various countries in the world.
- Impact on economic progress on education.
- Allocation of budget on education in different countries and its impact on educational progress.

10. Teacher Education and Teaching Behavior

Teacher education has received noteworthy concentration of educational researchers. These studies related to the areas are:-

- Historical development of teacher education.
- Curriculum and training programmes.
- Co-curriculum and practical work.
- Assessment, evaluation, and prediction of teaching.
- Attitudes of teachers and student teachers towards various parts of the pre-service and in service programmes.
- Personal, economic and socio-economic conditions of teachers.

11. Other areas in Research

- Preprimary Education
- Primary Education
- Secondary Education
- Higher Education
- Vocational Education
- Inclusive Education
- Distance Education
- Non formal Education
- Value Education
- Environmental Education

- Recommendations of Committees and Commissions
- Women Education
- Population Education

1.8 LIMITATIONS OF EDUCATIONAL RESEARCH

In spite of the application of scientific method and refinement of research techniques, tools and designs, education like other social and behavioral sciences, has not attained the perfection and scientific status of physical sciences. The steps in the scientific method guide researchers in planning, conducting, and interpreting research studies. Education and the other social sciences have not attained the scientific status typical of the natural sciences. It has not been able to establish generalizations and equivalent to the theories of physical sciences in the scope of explanation, prediction and control. Frequently, there is lack of unanimity among researchers in the field, so to what the established facts are or what explanations are satisfactory for the

assumed facts. Ary et sl. (1972) have pointed out several limitations which are involved in the application of scientific method in education.

Complexity of Subject Matter

Social scientists deal with the human subject. They are concerned with the subject's behavior and development, both as an individual and as a member of a group. Natural scientists deal with physical and biological phenomena, formulates relations among phenomena that are apparently unvarying throughout the universe. There are learners, teachers, and environments, each with variations that contribute to the behavioral phenomena observed in a setting. To understand the complex nature of human subjects, researcher has to deal with a number of variables. Each individual is unique in the way he grows, in his total personality. The researcher in the field of education, therefore, has to study the individual in groups and the impact of the behavior of group members on an individual. Thus, researchers must be extremely cautious about making generalizations because the data from one group or in one situation may have limited validity for other groups and other settings.

Difficulties in Observation

Observation in the social sciences is often less objective because it more frequently involves interpretation on the part of the observers. For example, the subject matter for investigation is often a person's responses to the behavior of others. Observers must make subjective interpretations when they decide that behaviors observed indicate the presence of any particular motive, value, or attitude. The problem is that the personal values and attitudes of social scientists may influence both what they choose to observe and their assessment of the findings on which they base their conclusions. Natural scientists study phenomena that require less subjective interpretation.

Difficulties in Replication

The chemist can objectively observe the reaction between two chemicals in a test tube. The findings can be reported and the observations can be easily replicated by others. Replication is much more difficult to achieve in the social sciences. An Indian educator cannot reproduce the conditions of a Russian educator's experimental teaching method with the same precision as that with which an Indian chemist can replicate a Russian chemist's experiment. Even within a single school building, one cannot reproduce a given situation in its entirety and with precision. Educational phenomena are singular events and can hardly be replicated for the purpose of observation with the same degree of precision and objectivity.

Interaction of observer and subjects

The research in the field of education is also a human being. His presence as an observer is a situation may change the behavior of his human subjects. For example, the school children may

not exhibit their natural behavior when they know that they are being observed for a particular type of behavior.

Difficulties in Control

The range of possibilities for controlled experiments on human subjects is much more limited than in the natural sciences. The complexities involved in research on human subjects present control problems that have no parallels in the natural sciences. Rigid control of experimental conditions is possible in the laboratory. Such control is not possible with human subjects; social scientists must deal with many variables simultaneously and must work under conditions that are much less precise. They try to identify and control as many of these variables as possible, but the task is sometimes very difficult.

Problems of Measurement

Systematic research must provide for measurement of the variables involved. The tools for measurement in the social sciences are much less perfect and precise than the tools of the natural sciences. Understanding of human behavior is complicated by the large number of determining variables acting independently and in interaction. Because the complexity and difficulty of observation, replication, and measurement complicate social science research, researchers must exercise great caution in generalizing from their studies. It is often necessary to conduct several studies in an area before attempting to formulate generalizations.

1.9 **Summary**

Human beings have sought to acquire knowledge through experience, authority, deductive reasoning, inductive reasoning, and the scientific approach. The scientific approach is widely regarded as the single most reliable source of new knowledge.

Research is the formal, systematic application of the scientific method to the study of problems. Research is considered to be more structured and systematic process of carrying out a scientific method of analysis that is directed towards discovery and development of an organized body of knowledge. It is planned activity to obtain answers to meaningful questions about phenomena or events through the application of scientific approach.

Educational research is the formal, systematic application of the scientific method to the study of educational problems. . Educational research is the way in which people acquire dependable and useful information about the educative process.

There are three types of research. They are - Basic Research, Applied Research and Action Research. Basic research is research, aimed at obtaining empirical data used to formulate and expand theory. Applied research aims to solve an immediate practical problem. It is research performed in relation to actual problems and under the conditions in which they appear in practice. Action research in education is any systematic inquiry conducted by teachers, principals, school counselors, or other stakeholders in the teaching– learning environment.

There is a wide scope of educational research including the area of educational philosophy, psychology, sociology, teacher education, curriculum development, measurement and evaluation, management and administration, comparative education, inclusive education, primary education, secondary education, higher education, women education, guidance and counseling etc.

Several limitations are involved in the application of scientific method in education such as complexity of subject matter, difficulties in replication, observation and control, problems in measurement etc.

1.10 Unit End Questions

1. What do you mean by the term Educational Research?

2. What are the types of Educational Research?

3. Why Educational Research does not qualify the criteria of scientific research?

4. What are the various scopes of educational research?

1.11 Suggested Reading

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