
UNIT 1 INTRODUCTION TO EDUCATIONAL RESEARCH

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1.1 INTRODUCTION

It has been estimated that knowledge almost doubles after every eight years. You may wonder why it is so and how it happens. In fact, human curiosity is the main reason for increase in knowledge. This knowledge is what may be called 'human commonwealth'. It knows no boundaries. People from all countries use this commonwealth and contribute to it. The present age has rightly been called the age of knowledge; knowledge generation is today as important as communicating it and helping others construct it for themselves. This is true of education as well.

The second major reason for creating knowledge can be attributed to the problems that face us in various fields, including education. Today, various countries are in competition with each other to acquire more knowledge and to generate it. This is because knowledge has truly become power. The most advanced countries in today's world are those that have a strong system of generating knowledge through research and development (R & D) activities. New knowledge leads to new technologies and new technologies sell because they fuel further development; they help us solve our problems, be these in the field of education or in other areas of human life.

The third reason responsible for generating knowledge is because of the decisions we take in our lives, especially in our professional life. Taking quick and right decisions has never been easy; but they who are more informed have always an edge over others. This holds good in education too. India is eager to improve her education system and make it more responsive to the needs and aspirations of her people so that the country may progress and prosper. Unless our education system generates knowledge to help solve our problems, our education system cannot be a top - class system. If we want to improve our higher education, the task should start at least 15

year earlier, at the level of primary education. This is because education is cumulative and no nation can build a superstructure on weak foundations. This task of generation of knowledge in the field of education is carried out through educational research.

In this Unit, we shall examine 'what is knowledge?' and 'what are the various purposes of research?' Later on we'll study about the nature and scope of educational research and also about different types of studies in educational research.

1.2 OBJECTIVES

After completing this unit, you will be able to:

- explain the types of and traditions in knowledge;
- describe various sources of knowledge;
- differentiate between the objectivists' and the subjectivists' conceptions of social reality;
- list purposes of research;
- describe the nature and scope of educational research; and
- explain the major types of studies in educational research.

1.3 KNOWLEDGE: NATURE AND TYPES

1.3.1 What is Knowledge?

It is not easy to define knowledge. Most dictionary definitions of knowledge do not do justice to the concept of knowledge. The word 'knowledge' has been derived from the verb 'to know'. Loosely defined, knowledge consists of all that a person knows and believes to be true. This would be called 'personal knowledge'.

Personal knowledge differs from one person to another. This is because much of one's personal knowledge may be unexamined, untested and therefore subjective. In the context of research, when we use the word 'knowledge', we refer to **scientific knowledge**. Scientific knowledge is well tried out, examined and tested (i.e. validated) knowledge. It is scientific knowledge, which is considered and accepted by experts to be true. Knowledge, in this sense, represents the entire content of our intellectual heritage; it is this knowledge which education tries to pass on to succeeding generations.

In spite of what has been said above, we should remember that the concept of knowledge expresses our standards, ideals, and tastes about the rightful exercise of cognitive skills because collectively they express our conceptions of truth and evidence. Knowledge is, therefore, concerned with how we come to know, what are our approved standards of competence - in performance, in inquiry and in criticism.

The concept of knowledge has been associated with what are called philosophical traditions; these are primarily three: the rationalistic, the empirical, and the pragmatic. According to the **rationalistic tradition**, knowledge is derived through deductive reasoning based on self-evident basic truths. Knowledge, according to rationalists, does not strictly depend upon experience; it depends instead on reasoning. Rationalists consider mathematics to be the ideal science. Mathematicians do not conduct experiments and surveys. Yet through reasoning, they arrive at truth that does not depend on experience for its confirmation.

Empirical Tradition

According to the empirical tradition, all natural phenomena can be known only through experience and not through deductive reasoning or intuition. Empiricists assume that

our mind has the power to compare, combine, analyse and generalize upon whatever is provided to it by experience. They also believe that the mind possesses the ability to perform logical operations upon concepts. The empirical tradition emphasizes learning from experience, through accurate observation, reason-based generalization, and willingness to revise laws that are not supported by events related to a particular phenomenon.

Pragmatic Tradition

The pragmatic tradition emphasizes the experimental character of the process of acquiring knowledge. The pragmatic tradition stresses that merely carrying out logical operations on basic truths is not enough; one needs to go beyond the generalizations about observed phenomena. Pragmatists are in favour of experimentation based on controlled observation of environment and events. The process of generating and testing knowledge is, according to Dewey, the process of “trying and undergoing” - trying an idea in practice and learning from observation of the consequences of the trial. Pragmatists are of the view that the mind has the capacity for active generation of ideas so that the problem faced by the individual can be resolved. Pragmatists are in favour of active and imaginative theorizing provided it leads to experimentation. The outcomes of the experimentation should give direction to imaginative theorizing.

1.3.2 Types of Knowledge

Declarative knowledge

According to Biggs (1999), knowledge is of many kinds. Chief among these is declarative or propositional knowledge. This knowledge refers to knowing about things or ‘knowing - what’. Declarative knowledge is generated by research; it is not solely based on one’s personal experience. Our knowledge about the solar system, about how different seasons are formed, how children learn, how humans process information - all these and much more are part of declarative knowledge. It is also known as public knowledge because it is tested through rules of evidence that make it verifiable, replicable, and logically consistent.

Functioning knowledge

Functioning knowledge is concerned with ‘how to do things’ and it involves performance based on understanding. Functioning knowledge is strongly rooted in declarative knowledge. Unless one is strong in declarative knowledge and understands what action(s) can be performed through it, it cannot become functioning knowledge. In other words, declarative knowledge when put to use for problem solving or for performing theory - based tasks, becomes functioning knowledge.

Procedural knowledge

Then comes procedural knowledge, which is essentially skill - based; it however does not have the high rigour of declarative knowledge. Procedural knowledge goes hand in hand with appropriate competencies in a particular area. Procedural knowledge is largely based on performance of right action in the correct sequence.

Conditional knowledge

There is yet another type of knowledge, viz., conditional knowledge, which is a combination of both procedural and higher level declarative knowledge. It informs us of what one should do under given circumstances, why and under what conditions one should do this and not that.

Check Your Progress

Notes: a) Space is given below for writing your answers.

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

1. Describe the difference between 'personal knowledge' and 'scientific knowledge'.

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2. What is the basic assumption in the empirical tradition of knowledge?

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3. List any three types of knowledge.

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1.4 SOURCES OF KNOWLEDGE

It is natural for human beings to seek answers to the problems they face. They try to increase their knowledge throughout their lives. For this they rely upon the following sources of knowledge:

Experience

Almost everyday we learn from our experience. When we see the sun rise from the East every morning, we conclude that the sun rises everyday in the East. Similarly, we learn through our experience to distinguish between things that are sweet, sour or bitter, very hot or very cold. While our experience serves as a useful guide in everyday life, it is quite fallible in many situations.

Social customs and traditions

Social customs and traditions represent the wisdom of generations that have preceded us. When we don't know what to do in certain situations, we often rely upon our customs and traditions. However, most customs and traditions do not change according to new knowledge and therefore quite often they become undependable and out of tune with the spirit of the time. For example, the traditional treatment for typhoid and infertility are entirely unscientific and therefore ineffective. Thus customs and traditions may not have any scientific basis and may be rooted in make - belief or even superstition.

Reasoning

Reasoning is a more dependable means of reaching and establishing truth. Reasoning is of two types viz., deductive reasoning and inductive reasoning. **Deductive reasoning**

is associated with Socrates; it is syllogistic. In a syllogism, we have a major premise, a minor premise and an inference, which is warranted by the major premise. For example,

Man is mortal. (Major premise)

Ram is a man. (Minor premise)

Ram is mortal. (Inference / Deduction)

In deductive reasoning, we start with a generalization and apply it to a specific case and deduce an inference.

In **inductive reasoning**, we start with a specific event and make many more observations and on the basis of the commonality in a given set of observations, we formulate a generalization. Thus while in deductive reasoning we start with a generalization and apply it to a specific instance. In inductive reasoning, we proceed in the reverse order; we start with a particular event / instance and conclude with a generalization. Fig.1 brings it out clearly.

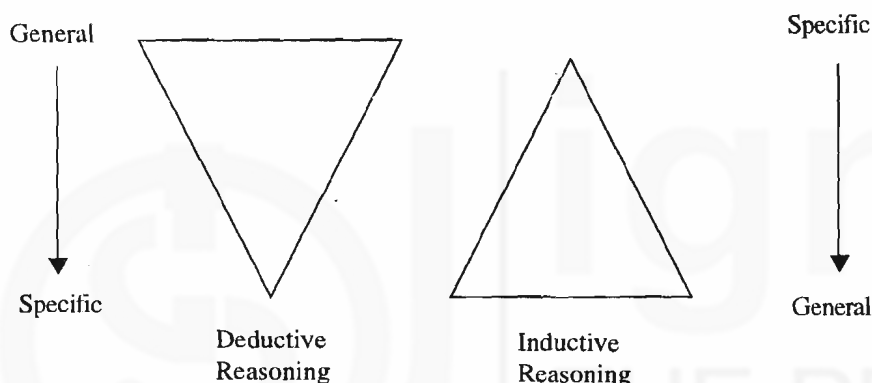


Fig. 1.1: Comparison of Deductive and Inductive Reasoning

Scientific Method

The scientific method was formulated in order to avoid the defects of deductive reasoning as well as inductive reasoning. The scientific method is the method of research. In spite of the variety, research has a typical set of procedures based on the scientific method, which is also known as the **hypothico-deductive paradigm**. According to researchers, the scientific method consists of the following sequence of steps (See Fig. 1.2):

- Step 1: A theory exists about the phenomenon.
- Step 2: The researcher identifies and researches questions in the context of the problem.
- Step 3: The researcher formulates a research hypothesis based on the theory. The research hypothesis is a statement of the possible relationship between two or more variables and it is testable.
- Step 4: The researcher describes the specific procedures i.e. operations by which the variables are defined and actions performed on them. The researcher formulates a null hypothesis on the research hypothesis, which can be tested statistically. He develops an appropriate research design i.e. a plan of action for testing the null hypothesis.
- Step 5: The researcher conducts the study according to the research design and collects the data.

- Step 6: The null hypothesis is tested by the researcher using the data collected through the study.
- Step 7: The null hypothesis may be rejected or accepted on the basis of statistical testing. If the null hypothesis is accepted, the theory is confirmed. If the null hypothesis is rejected, then the research hypothesis may have to be reformulated and tested again in order to solve the research problem. For this, steps 2-7 are repeated.

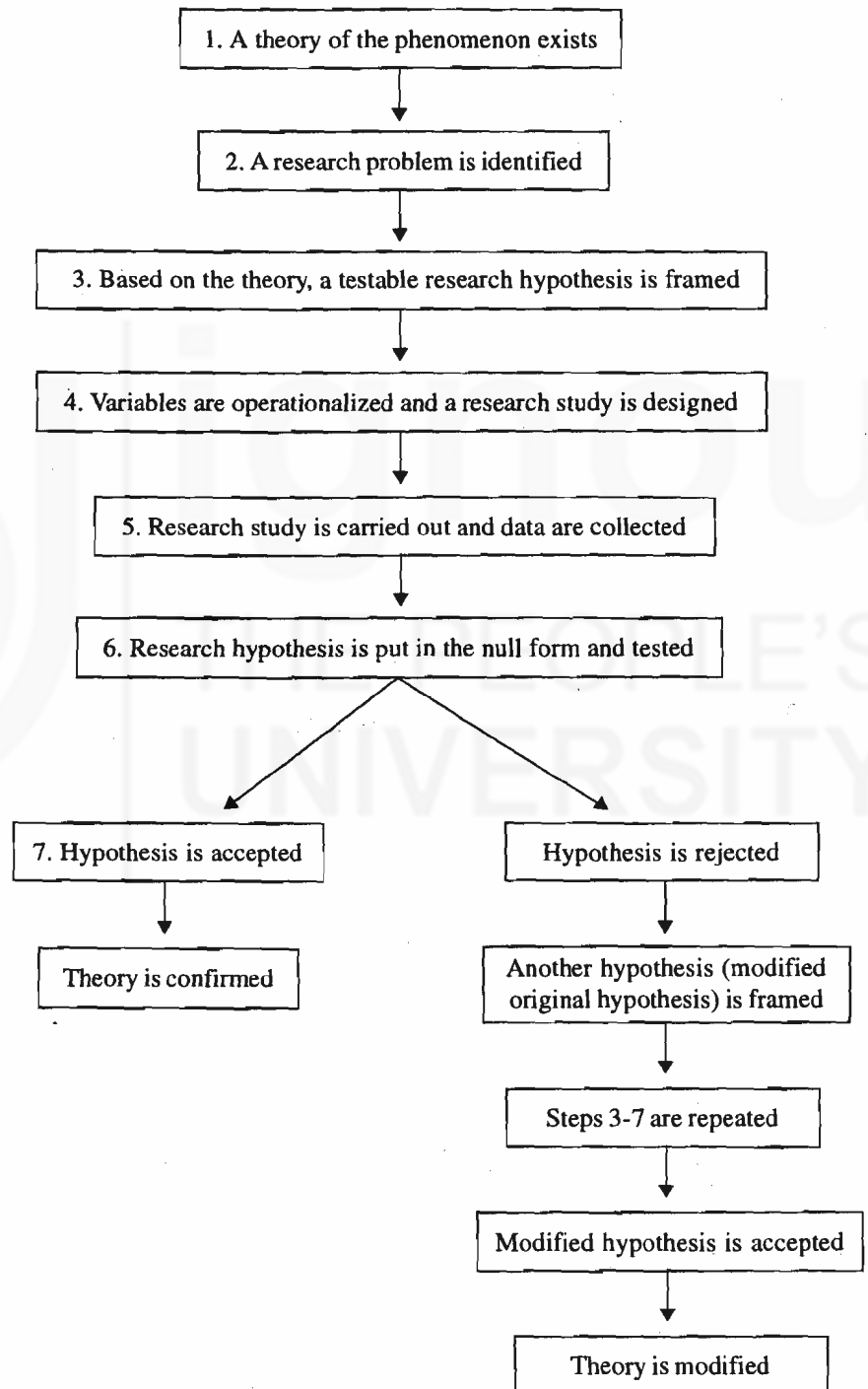


Fig. 1.2: Flow Chart on using Scientific Method

Since research is based on the scientific method, very often these expressions are used interchangeably and research too is considered a source of knowledge.

Check Your Progress

Notes: a) Space is given below for writing your answers.

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

4. Briefly list the steps in the Scientific Method.

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5. Name the three parts of a syllogism.

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1.5 NATURE AND CONCEPTIONS OF SOCIAL REALITY

From the earliest times, human beings have been trying to understand the world in which they are born, grow up, and live their lives. This world can be divided into two parts: (a) the physical environment which consists of the natural environment (i.e. various objects and life forms) and objects created by human beings as they become more civilized (these are also known as 'artifacts'); and (b) the social environment which is the chief characteristic of human society. Social reality is the name given to the social environment. Growing up in a particular social environment shapes our life styles, attitudes, beliefs, value systems and worldview. These beliefs and values differ from one society to another, and change over time within the same society. For example, the beliefs of an Eskimo and an Indian would be very different from that of one another'. And each would feel that his view and attitude is correct.

The manner in which we look upon the social reality around us determines our conception of social reality. For centuries, human beings believed that our social reality is no different from our physical reality. It was also believed that social reality, like our physical reality, exists whether we are a part of it or not. The study of our social reality has given birth to the social sciences just as the study of the physical reality has given birth to the natural sciences. Those who believe that the essential nature of social reality and social sciences is the same as that of physical reality and physical sciences, try to discover and formulate universal laws in social sciences, just as a physical scientist would try to discover and formulate universal laws about the physical world. This conception of social reality would be called "the objectivists' conception".

Opposed to the objectivists' view of social reality is "the subjectivists' conception". According to this view, even though as animate objects, human beings may appear alike, as humans, as individuals, they differ from each other. The human beings, according to the subjectivists' view, live in two worlds at the same time: the physical world and the social world. Their behaviour in the social world is neither determined nor explained by the laws of the physical world. The social reality is not static; it changes over time and is in a state of flux. Let us, now examine "How the objectivists' conception and the subjectivists' conception of social reality differ from one another?" In fact, these two views of social reality are based on a number of different assumptions. These assumptions are essentially related to the following four questions:

- a) What is the essential nature of the social phenomena?
- b) What is the nature of knowledge? How is it acquired?
- c) What is human nature? Is it pre-determined or is it characterised by free will?
- d) What methods should we use in order to study social phenomena and human nature?

The objectivists believe that reality exists independent of human beings; the world does not need an observer who may observe it and say that it exists. The subjectivists believe that the world is the result of human thought and consciousness. In other words, it is created by the human mind. About knowledge and how it is acquired, the objectivists believe that knowledge is comparable to a tangible object; it can be passed from one person to another just like an object, therefore it can be acquired from others if one does not possess. The subjectivists believe that knowledge has to be experienced and one constructs it for oneself. Hence, knowledge, according to this view, is subjective, personal and unique. The objectivists believe that human nature is predetermined; human beings are no different from other forms of life and they respond to various objects and events in a mechanical manner. The subjectivists, on the other hand, are of the view that human nature is characterized by consciousness and freedom of choice. So far as the question of methodology for study of social phenomena and human behaviour is concerned, the objectivists emphasise that discovering universal laws that explain human behaviour should be the task of research; the differences among human beings are not as important as their similarities. The subjectivists are of the view that research methods used for social phenomena and human behaviour should emphasise what is unique about them; the focus should be on understanding and explaining the particular and not the universal.

It is hardly surprising that these two views of social reality recommend the use of methods of research, which are very different from one another. The objectivists recommend the use of experimental method in which human behaviour is observed in carefully controlled situations. The subjectivists, on the other hand, recommend the use of ethnographic methods wherein human behaviour is observed in its natural, uncontrolled environment.

Check Your Progress

Notes: a) Space is given below for writing your answer.

b) Compare your answer with that given at the end of the unit.

6. Briefly describe the subjectivists' view of social reality. (in one sentence)

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1.6 PURPOSES OF RESEARCH

Research is an activity that helps us generate knowledge; it helps us in testing the existing knowledge and it also helps us in creating new knowledge. One may ask 'But why do we need more and more knowledge?' This can be best answered by stating that research and the knowledge generated through it help us satisfy our curiosity and solve the problems we face. Human beings are born curious and throughout our lives we keep on seeking answers to questions that arise in our minds. Research is essentially the process of conducting disciplined inquiry. Research serves the following purposes:

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. Behaviourist theory of learning explains how habits can be formed, and fears can be got rid of but it does not fully explain how we learn language. Similarly, 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 is known as basic research, also called fundamental research. This type of research is very rigorous and based on carefully selected samples and techniques.

Problem-Solving

In education, we confront a variety of problems e.g. what is the best method of teaching a language? How can children learn skills more efficiently? How can scientific creativity be fostered among children? How can students learn to think mathematically? How can children develop morally and develop concern for others? etc; all these problems involve relatively more effective ways of promoting learning and development. Such problems can surely be attempted through trial and error but we may not succeed at all through trial and error or may take more time than is necessary. Research is essentially systematic inquiry and it can help us discover more effective ways of teaching and facilitating learning. Research concerned with problem solving is also known as applied research. Most educational research is applied research because it is concerned with formulation of procedures and sequences of action to achieve our purpose i.e. solving problems that we encounter as teachers.

Action in Specific Situations

Very often classroom teachers encounter problems that do not allow them to perform as effectively as they would like to. For example, a particular teacher may notice increasing truancy in his class or a teacher of English may find that students' attitude to the English language is far from positive and as a result they do not take interest in their English class. 'How to reduce truancy in my class'? would be the problem faced by Teacher A and 'How to make learners' attitude towards English more positive'? would be the problem confronted by Teacher B. You must have noted that both these problems are not general educational problems; on the other hand, these problems are faced by specific teachers in a specific class in a particular school of a particular town or city. These problems are therefore localized problems. The concerned teachers may take appropriate steps to study the problem in detail and examine its causes and finally may be able to solve their problems by themselves. Sometimes two or more teachers from the same school or neighbouring schools may exchange their experiences and help each other solve a particular problem. Such action in specific situations is quite systematic and the result of careful observation and analysis. Research that serves this purpose is known as "action research" and it is now being increasingly used. Results of action research usually are not extended to other situations.

Training of Future Researchers

Research also serves the purpose of preparing future researchers by providing them planned research experiences, which may be initially quite simple but later on become more and more complex. Surely, if research is to continue during the coming years, a new generation of researchers must be trained in time. As a student of this programme, you will be working on a dissertation (i.e. small scale research) on a specific educational problem. This will provide you with first hand experience of what activities are involved in research and what doing research feels like. M.Phil. Scholars and Ph.D. scholars in education also conduct research, which may be considered intermediate level and advanced level training for preparing researchers.

Check Your Progress

Notes: a) Space is given below for writing your answer.

b) Compare your answer with that given at the end of the unit.

7. Briefly describe 'generation of knowledge' as a purpose of research.

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1.7 WHAT IS EDUCATIONAL RESEARCH?

We now know that research is a systematic inquiry based on the scientific method and concerned with understanding, prediction and control of phenomena. Educational research applies the scientific method for systematic study of educational situations. It seeks to help us solve educational problems.

Like research in other disciplines, educational research is characterized by the following features:

- 1) It is based on inductive - deductive reasoning in which the researcher observes the phenomenon, formulates a logically sound hypothesis (or a set of hypotheses) and tests its (their) validity empirically. The validated hypotheses are again checked against new data through further observation.
- 2) It is empirical in nature. In other words, educational research proceeds through systematic study of reality that can be observed, measured and recorded.
- 3) It is self - correcting. Results of research that appeal to our reason today may be disproved by new data. This is so in spite of the fact that the researcher takes all precautions to avoid error. Further research in the same area would remove the error, if any. Thus educational research like research in other disciplines is self - corrective.

We have already examined two conceptions of social reality. Since education is one of the social sciences, we find that educational research uses both conceptions of social reality and the methods that are considered appropriate for exploring it. This explains why educational research makes use of the approaches used in scientific research as well as those used in social science research. The objectivists' approach to research is known as the **positivist** paradigm while the subjectivists' approach to research is known as **non - positivist** or **humanistic** paradigm. A paradigm can be defined as a way of looking at a phenomenon or a broad perspective of it. A paradigm determines research approach and methods. Educational research uses methods derived from or based on positivist as well as non - positivist paradigms depending upon the nature of the problem being investigated. We will study various major types of studies in educational research a little later (see 1.8). We may conclude by saying that educational research is concerned with issues that engage the attention of teachers and educationists. To quote Travers, "The scientific goal of educational research is to discover laws or generalizations about behaviour which can be used to discover, to make predictions and control events within educational situations" (Travers, 1964, 5). Advocates of the humanistic paradigm would take the stand that educational research should help us understand how humans learn and behave in educational settings for learning/performing educational tasks.

Check Your Progress

Notes: a) Space is given below for writing your answer.

b) Compare your answer with that given at the end of the unit.

8. Briefly explain why educational research uses both positivist and non - positivist approaches for solving educational problems.

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1.8 SCOPE OF EDUCATIONAL RESEARCH

Educational research covers a vast territory and it can be looked upon and classified in many ways, chief among which are the following:

Classification by Levels of Education

This classification would result in research in pre-school education, research in primary, secondary and tertiary (i.e. higher) levels of education. Under research on secondary level and tertiary level education, we have research studies on face - to face education and on open and distance learning.

Classification by Curriculum Areas

This classification results in research studies in various areas of school curriculum e.g. language education, science education, math education, social sciences (including Environmental Science) education, art education, business studies education etc; Under each of these, there exist many sub - areas. For example, language education research could deal with teaching of the first language, or second language or foreign languages. In the context of Hindi, a first language for many students, research studies could be conducted on teaching grammar, teaching poetry, teaching reading comprehension and teaching writing skills, to name some of the major aspects. In teacher education, we have curriculum areas like philosophy of education, sociology of education, history of education, educational psychology, educational technology, peace education, value education, human rights education, etc; Research studies can be conducted in all these areas as also in pre - service teacher education and in - service teacher education.

Classification by Research Methods Used

Educational research may be classified according to the research method used in a particular research study. Such classification will yield types like experimental research, historical research, survey research, ethnographic research, developmental research, case study research etc;

However even these three schemes of classification do not completely account for the entire variety of studies in educational research. With the passage of time, new priorities in educational research lead to new areas of research. When the First Survey of Research in Education in India was published in 1974, the entire research conducted till 1970 was classified under 17 headings, but 23 years later when the Fifth Survey was published in 1997, the variety in research studies generated 38 headings! (see Table 1.1)

It is hardly surprising that during the intervening 23 years about 25 new areas in educational research had emerged and substantial quantity of research had been carried out in each area.

Table 1.1: The Changing Map of Educational Research in India.

The First Survey (1974)	The Fifth Survey (1997)
1. Educational research in India 2. Philosophy of Education 3. History of Education 4. Sociology of Education 5. Personality, learning and motivation 6. Guidance and counselling 7. Tests and measurement 8. Curriculum, methods and textbook 9. Programmed learning 10. Correlates of achievement 11. Educational evaluation and examinations 12. Teaching and teacher behaviour 13. Teacher education 14. Educational Administration 15. Economics of Education 16. Social and adult education 17. Educational surveys	1. Educational research in India 2. Philosophy of Education 3. Sociology of Education 4. History of Education 5. Economics of Education 6. Psychology of Education 7. Mental health * 8. Cognitive processes * 9. Social Processes * 10. Motivation 11. Creativity and innovations * 12. Guidance and counselling 13. Curriculum development 14. Pre - primary education* 15. Primary education* 16. Secondary education * 17. Higher education * 18. Social science education * 19. Science education * 20. Mathematics education * 21. Physical and health education * 22. Moral, arts and aesthetics education * 23. Educational technology * 24. Teaching strategies * 25. Teacher education: Pre - service and In-service* 26. Vocational and technical education * 27. Special education * 28. Open and distance education * 29. Adult, continuing and non-formal education * 30. Education of S/Cs, S/Ts and minorities * 31. Education of girls and women * 32. Demographic studies in education and population education * 33. Ecological and environmental studies in education * 34. Comparative education * 35. Educational assessment and evaluation * 36. Educational planning and policy research * 37. Organization, administration and management of education * 38. Correlates of achievement (* denotes a new area of educational research not listed in the First Survey).

'Teaching' constitutes a macro - area in educational research. Let us examine the changes that took place in 'research in teaching' during the period 1963 - 1986. The year 1963 marks a watershed in research on teaching because it was during this year that N.L. Gage's Handbook of Research on Teaching (also known as 'the First Handbook') was published. The year 1986 witnessed the arrival of M.C. Wittrock's Third Handbook of Research on Teaching. It should be interesting to examine the new areas that appeared in research on teaching during these 23 years. Gages' Handbook lists 23 areas whereas Wittrock's Handbook covers 35 areas. It is not the difference in the number of areas that impresses us; far more interesting should be the changes in areas in terms of new trends and changing priorities, because changes in research in teaching called for an entire new scheme of classification of research studies. (See Table 1.2)

Table 1.2: Changing Emphasis on Research in Teaching

Gage's Handbook (1963)	Wittrock's Handbook (1986)
Part I: Theoretical Orientations 1. Historic exemplars of teaching method 2. Logic and scientific method in research on teaching 3. Paradigms for research on teaching Part II: Methodologies in Research on Teaching 4. Statistics as an aspect of Scientific method in research on teaching 5. Experimental and quasi - experimental designs for research on teaching 6. Measuring classroom behavior by systematic observation 7. Rating methods in research On teaching 8. Testing cognitive ability and achievement 9. Measuring non-cognitive Variables in research on teaching Part III: Major Variables and Areas of Research on Teaching 10. Analysis and investigation of teaching methods 11. The teachers' personality and characteristics 12. Instruments and media of instruction 13. Social interaction in the classroom 14. The social background of teaching Part IV: Research on Teaching Various Grade Levels and Subject Matters 15. Research on teaching in the nursery school 16. Research on teaching reading 17. Research on teaching the social studies 18. Research on teaching composition and literature 19. Research on teaching secondary school mathematics 20. Research on teaching science 21. Research on teaching foreign languages 22. Research on teaching the visual arts 23. Research on teaching at the college and university level	Part I: Theory and Method of Research on Teaching 1. Paradigms and Research programs in the study of teaching : A contemporary perspective 2. Philosophy of research on teaching : Three aspects. 3. Measurement of teaching 4. Quantitative methods in research on teaching 5. Qualitative methods in research on teaching 6. Observation as inquiry and method 7. Synthesis of research on teaching 8. Theory, methods, knowledge, and research on teaching Part II: Research on Teaching and Teachers 9. Teachers' thought processes 10. Students' thought processes 11. The teaching of learning strategies 12. Teacher behavior and student achievement 13. Teaching functions 14. Classroom organization and management 15. Classroom discourse 16. Media in teaching 17. Philosophy and teaching Part III: The Social Institutional Context of Teaching 18. The culture of teaching 19. Research on teacher education 20. School effects Part IV: Adapting Teaching to Differences Among Learners 21. Adapting teaching to individual differences among learners 22. Teaching creative and gifted learners 23. Teaching bilingual learners 24. Special educational research on mildly handicapped learners Part V: Research on Teaching of Subjects and Grade Levels 25. Research on early childhood and elementary School Teaching Programs 26. Research on teaching in higher education 27. Research on written composition 28. Research on teaching reading 29. Research on teaching and learning mathematics : Two disciplines of scientific inquiry 30. Research on natural sciences 31. Research on teaching arts and aesthetics 32. Moral education and value education 33. Research on teaching social studies 34. Research on professional education 35. Research on teaching in the armed forces

Check Your Progress

- Notes:** a) Space is given below for writing your answers.
b) Compare your answers with those given at the end of the unit.
9. Give three examples of different curriculum areas in educational research.
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10. Write names of three new areas in research on teaching.
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11. Write names of two new areas in recent educational research in India.
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1.9 TYPES OF STUDIES IN EDUCATIONAL RESEARCH

Studies in educational research are catergorised under two broad heads: (a) quantitative studies, and (b) qualitative or non-quantitative studies. Qualitative studies are also called ‘descriptive’ studies by some researchers. Various types of research studies under these broad heads are shown in Table 1.3.

Table 1.3: Types of Research Studies

Educational Research	
<i>Quantitative (Based on positivist paradigm)</i>	<i>Qualitative (Based on Humanistic paradigm)</i>
1. Experimental 2. Quasi experimental 3. Correlational	1. Survey 2. Case Studies 3. Documentary analysis 4. Developmental 5. Ethnographic 6. Historical 7. Philosophical

A brief description of these types of research studies is given below. You will study about these types of research later on in detail. In Unit 5, you will study about descriptive research, which includes survey research, case study research, documentary analysis studies and developmental studies. Units 6 and 7 provide detailed treatment of experimental and correlational studies. Unit 8 is based on ethnographic research of various types while Unit 9 gives a comprehensive description of historical and philosophical research.

Experimental Research

Experimental research in education is concerned with the investigation of cause-effect relationships in educational events. Variable(s) related to cause must precede those

related to the effects. Since in terms of time, the cause variables occur first, they are also known as 'antecedents' while effect variables are called 'consequents'. In experimental studies, the researcher observes 'what happens' if an antecedent is varied under control; the effect is examined on another variable or a set of variables. The variable, which is varied, is also known as the '**independent variable**' (IV) while the variable(s) on whom the effect is measured are dependent variables (DV). Issues like 'which method of teaching is more effective in promoting students' learning in a particular subject?' are settled through well-designed experimental studies.

Quasi-experimental Studies

The literal meaning of 'quasi' is "seemingly, but not really". Thus research studies that do not use a truly experimental design are called quasi - experimental studies. Since educational research is carried out on human beings who are, unlike objects, quite changeable, and controls cannot be exercised absolutely, therefore much of experimental research in education is quasi - experimental in nature. This type of research investigates the same issues that experimental research does, the difference is only in terms of the manner in which an experiment is designed and conducted.

Correlational Research

Correlation means 'going togetherness'; in other words, correlation between two variables tells us about the relationship between them. For example, if we know how achievement in mathematics (x) is related with achievement in science (y), then on the basis of marks, in 'x' we can predict marks in 'y' and vice versa. Variables may be positively related with one another (e.g. High achievement in mathematics is associated with high achievement in science); or the correlation may be negative (e.g. High achievement in maths is associated with low achievement in art); or the correlation may be zero (e.g. high achievement in maths is sometimes associated with low achievement in art, sometimes high achievement in art and sometimes even with average achievement in art). Correlation can vary between '0' and '1' and is expressed in terms of direction as well as magnitude (e.g. + 0.91, - 0.23, + 0.53 etc.). Unlike experimental research, which aims at discovering cause-effect relationship among variables, correlational studies are concerned with problems like 'What is the relationship between educational achievement and levels of anxiety'? However, the correlation must not be interpreted to mean that one variable is the cause of high or low measure of the other variable. Frequently there are other factors that influence both of the variables under consideration. Correlation is always relative to the situation under which it is obtained, and its size does not represent any absolute natural fact. It is relative to the circumstances under which it is obtained and should be interpreted in the light of those circumstances. Correlational studies enable us to predict one variable from another (or many others). Correlational research helps us explore and understand the phenomena and thus it can prove helpful in theory building.

Descriptive Research

Descriptive research investigates 'what exists'. If it is conducted on large samples through surveys, it is called survey study. It may also be based on detailed and comprehensive study of just one unit of population, i.e. just one case, thus resulting in a case study. Descriptive research may examine how various aspects of human development (e.g. intelligence, attitudes, social development, moral development) or skills (cognitive skills, social interaction skills etc.) develop in groups of persons of the same characteristics. Such studies are called 'developmental studies'. Similarly analysis of documents related to a particular aspect / area of education (e.g. religious and moral instruction, value education etc.) is collectively known as documentary analysis studies. All these are part of descriptive research.

Ethnographic Research

Ethnographic research is just the opposite of experimental research. In the latter, research is conducted through carefully controlled experiments but in ethnographic research, the emphasis is on naturalistic (i.e. totally without control) field studies. Ethnographic studies typically describe events that occur in the life of an educational group or a society with respect to social structures and behaviour and perceptions of the individual members. Thus ethnographic studies collect primary data (i.e. facts as they occur) and interpret its meaning. Ethnographic studies use both participant as well as non-participant observation for collecting and recording primary data.

Historical Research

Historical studies are concerned with the study of 'what was'; they try to determine, evaluate and understand past events primarily for the purpose of gaining a clearer understanding of the present and a better prediction of the future. Historical research thus seeks to provide a perspective on the past so that we may be able to understand the present and the direction the course of events would take in future. Historical research is obviously useful in understanding the trends and the problems associated with educational developments during a period of time. Historical research can also help us understand well - established educational systems like the one we have in India.

Philosophical Research

Philosophical research studies in education can be taken up under historical research. These studies usually deal with philosophical aspects of education (e.g. related to knowledge and acquiring knowledge), metaphysical (i.e. related to reality aspects) or axiological (i.e. concerned with values) aspects of the education process. Philosophical research is basically interpretive in its approach and it involves careful definition of the terms and processes.

Check Your Progress

Notes: a) Space is given below for writing your answer.

b) Compare your answer with that given at the end of the unit.

12. Answer by completing the following:

- a) Experimental studies aim at discovering relationship among variables.
- b) Case studies are part of research.
- c) Correlational studies are concerned with discovering among variables.
- d) Historical research examines and helps us understand the
- e) Documentary analysis studies come under research.

1.10 LET US SUM UP

In this Unit we have learnt about knowledge, the two major philosophical traditions associated with it, types and sources of knowledge. We have also learnt how research is a major source of knowledge and knowledge - generation. Thereafter we examined the various steps in scientific method, also called the "hypothetico - deductive paradigm". Since social reality differs a good deal from the physical reality, we examined the two

conceptions of social reality viz., the objectivists' and the subjectivists' and the respects in which they differ from one another.

We also learnt that research is a disciplined inquiry for knowledge and serves four purposes:

- a) generation of knowledge,
- b) problem solving,
- c) action in specific situations, and
- d) training of future researchers.

We have learnt about what is educational research and have also examined its scope. We have learnt that educational research deals with almost all issues related to education and that educational research is classified according to levels, curriculum areas and research methods used. We also learnt how priorities change with time even within the same area of educational research.

Towards the end of this Unit we learnt about various types of research studies in education and what they aim at. In this section we learnt about experimental and quasi-experimental studies, correlational research, descriptive research, ethnographic research, historical and philosophical research.

1.11 UNIT-END ACTIVITIES

1. List different areas of educational research in the Indian context.
2. List different areas of educational research as documented in Dissertation Abstracts International (DAI).

1.12 POINTS FOR DISCUSSION

1. Is educational research carried out to generate new knowledge only? Discuss.
2. The scope of educational research is becoming wider with the emergence of new problems in education. Discuss.

1.13 SUGGESTED READINGS

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1.14 ANSWERS TO CHECK YOUR PROGRESS

1. Personal Knowledge is based on one's personal experience and it differs from person to person. Scientific knowledge is tested and validated; it is widely accepted by the experts.
2. Empirical tradition of knowledge assumes that knowledge can be known only through experience; it cannot be known through deductive reasoning or intuition.
3. Any three: declarative (or propositional) knowledge, procedural knowledge and conditional knowledge.
4.
 - a) A theory is available about the phenomenon.
 - b) A research problem is identified.
 - c) A research hypothesis is framed for testing
 - d) Operations are defined and a research design is prepared.
 - e) Research is conducted and data are collected.
 - f) The research hypothesis is tested.

The research hypothesis is accepted or rejected. If it is rejected, then the hypothesis is modified and steps 'c' to 'g' are repeated.
5. Three parts of a syllogism: Major premise, minor premise, and inference or deduction.
6. According to the subjectivists' view, social reality is not static; it is dynamic and ever evolving.
7. Generation of knowledge is a major purpose of research. It is concerned with theory - building by testing a current theory and modifying it if necessary in the light of new data.
8. Educational research employs both positivist as well as non-positivist paradigm because of the nature of research problems in education. Some of these problems can be solved better through the use of positivist paradigm while others can be resolved more satisfactorily through humanistic paradigm.
9. Languages, sciences, social studies, business studies, arts etc; (any three).
10. Teachers' thought processes, teaching of learning strategies, classroom discourse etc; (any three other than those listed in NL Gages' Handbook).
11. Educational planning and policy research, and Teaching strategies (Any two new areas from the 5th Survey).
12. (a) cause - effect (b) descriptive (c) patterns of relationships (d) what was; present (e) qualitative.

UNIT 2 KNOWLEDGE GENERATION: HISTORICAL PERSPECTIVE-I

Structure

- 2.1 Introduction
- 2.2 Objectives
- 2.3 Sources of Knowledge
 - 2.3.1 Life Experiences
 - 2.3.2 Authority
 - 2.3.3 Customs and Tradition
 - 2.3.4 Deductive Reasoning
 - 2.3.5 Inductive Reasoning
- 2.4 Scientific Method
 - 2.4.1 Defining Scientific Method
 - 2.4.2 Scientific Method combines Induction and Deduction
- 2.5 Let Us Sum Up
- 2.6 Unit-end Activities
- 2.7 Points for Discussion
- 2.8 Suggested Readings
- 2.9 Answers to Check Your Progress

2.1 INTRODUCTION

In Unit I it has been clarified that research in social sciences in general and in education in particular, is a scientific process of generating knowledge. Man has been generating knowledge from the dawn of civilization on the basis of his life experiences, teachings from authority, influences from customs, traditions and socializing agents like educational institutions. Generating knowledge or discovering truth has also been largely possible by the use of deductive and inductive reasoning. Looking into the limitations of these two processes of reasoning, scholars integrated the most important aspects of deductive and inductive methods, shaping out scientific method or approach to knowledge generation. This has been the fundamental approach to research and hence to generation of knowledge.

In this unit, we shall look into the evolution of the knowledge generation process in a historical perspective from earliest times to modern days.

2.2 OBJECTIVES

After having studied this unit you will be able to :

- discuss that research generates knowledge;
- explain that different facets of the knowledge generation process have evolved through time;
- discuss various sources of knowledge.
- differentiate between knowledge generation through inductive and deductive modes of reasoning;

- explain the meaning of scientific method;
- justify the scientific method as a more scientific mode of knowledge generation than other modes;
- examine the process and limitations of Aristotelian deduction;
- examine the process and limitations of Baconian induction.

2.3 SOURCES OF KNOWLEDGE

Man needs knowledge and generates it for the purpose of his life activities. Without going into the theory of knowledge (epistemology), it may be considered that what we call 'Knowledge' is the product of knowing, perceiving, thinking, guessing, being mistaken, remembering, finding out, inferring, proving, reflecting, imagining and so on. Knowledge may be in the form of fact, belief or judgement. A fact is anything that exists or can be conceived of; what we claim to know is belief or judgement. Human knowledge takes the form of belief or judgement about a particular phenomenon. Some beliefs may be supported by evidence, may be based on our perceptions and experiences. The beliefs, which are supported by evidence are called justified beliefs. Only justified beliefs are knowledge. Knowledge includes what we know about matters of fact as well as the principles and processes of inference. It has three elements:

- (i) there is a system of ideas;
- (ii) the ideas correspond to things actually existing;
- (iii) there is belief in such correspondence.

If we look at the historical perspective it will be evident that efforts of centuries were required by man to improve his capacity and readiness to obtain reliable knowledge. To gain some insight into the tortuous pathway he traversed, the following discussions briefly examine the various sources of knowledge he has drawn upon to solve problems. These are

- (i) Life experiences,
- (ii) Authority,
- (iii) Customs and tradition,
- (iv) Deductive reasoning,
- (v) Inductive reasoning,
- (vi) Scientific Method.

2.3.1 Life Experiences

In order to conduct his life activities satisfactorily and successfully man has to understand his environment and the nature of phenomena it presents to his senses, otherwise he can hardly hope to solve problems he faces constantly. One of the means by which man seeks the answers to his problems are his life experiences. Perhaps the most primitive, and yet the most fundamental source of the solution to a problem lies in personal experiences. Thus, confronted with a sudden flow of water down a ravine, prehistoric man could have solved his problem and saved his life if he had only remembered that water does not generally stay on hills. On an elementary level he had the knowledge of a basic scientific fact that water runs downhill. In ancient times, nomads and various tribes from their personal experience probably remembered that certain wild fruits always made them ill, that grains ripen at particular times of the year, and that sudden floods in the rivers during rainy season were due to the fact that water does not generally stay on hills. A young man can repair a puncture in a bicycle inner tube because he has done it several times previously. People may thus draw upon their own individually accumulated body of knowledge and skills derived from encounters and acquaintance

with facts and events in their environment. However, one has to keep in mind the limitations of personal experiences as a source of knowledge. Although experience is a familiar and well-used source of knowledge, it still may be inappropriate for new problems. Also, an uncritical use of personal experience may lead to erroneous conclusions. People may make errors when observing or reporting what they have seen or done. They may

- Omit evidence that does not agree with their opinion;
- Use measuring instruments that entail many subjective estimates;
- Establish a belief on insufficient evidence;
- Fail to observe significant factors relating to a specific situation; or
- Draw improper conclusions or inferences owing to personal prejudices.

In general, it may be observed how one is affected by an event depends upon who the one is. Two persons will have very different experiences in the same situations. For instance, two supervisors observing the same classroom at the same time could truthfully compile very different reports if one focused on and reported the things that went right and the other focused on and recounted the things that went wrong.

2.3.2 Authority

Seeking and accepting the explanation of authorities is a well-established method of getting knowledge and solving problems encountered in the environment. When one has not had personal experience with a phenomenon, the obvious recourse is to consult their parents, their teachers, or even their older siblings for answers to problems with which they are not familiar. Rather than attempting to determine truth independently, people often seek the advice of experts who, because of their intellect, training, experience, or aptitudes, are better informed than other people. Experts are necessary in a complicated culture such as ours where knowledge is expanding so rapidly that no one can be an expert at everything. And obviously certain individuals have such a wide experience and deep insight that their advice can be of immense benefit. But it should never be forgotten that as sources of knowledge, authorities have limitations. Authorities cannot be infallible. They may at times be in disagreement among themselves on issues. This shows that their authoritative statements are nothing but personal opinions, and not facts. We should, therefore, check their agreements and evidence upon which they base their claims to knowledge. Accepting experts' opinions unconditionally, thus, may lead us to untruth rather than knowledge.

2.3.3 Customs and Tradition

It goes without saying that customs and tradition serve as sources of knowledge for the members of a particular society and culture. They depend on custom and tradition for answers to many questions related to their professional and everyday problems. People usually and readily accept customary modes of dress, speech, food, worship and etiquette. In practical life this automatic acceptance of approved patterns of behaviour is often necessary, because one cannot question all things. In fact, custom and tradition have been especially useful influences in school setting, where educators often rely on past practices as a dependable guide. But the limitations of custom and tradition as sources of knowledge should not be lost sight of. One should not make the mistake of assuming that everything that has customarily been done is right or that an appeal to the accumulated knowledge and wisdom of ages will always lead to the truth. For instance, an examination of history of education reveals that many traditions that had prevailed for years were later found to be erroneous and had to be rejected.

2.3.4 Deductive Reasoning

Reasoning is inherently a thinking process. Man has recourse to reasoning in order to obtain reliable knowledge. He attempts to comprehend the world around him by applying

the faculty of reasoning. There are two types of reasoning: deductive and inductive. Deductive reasoning can be considered as a thinking process in which one proceeds from general to specific statements through logical arguments.

Aristotle's syllogism

Deductive reasoning is based on the syllogism, which was the great contribution of the Greek philosopher, Aristotle, to formal logic. In its simplest form, the syllogism consists of a major premise based on a priori or self-evident proposition, a minor premise providing a particular instance, and a conclusion (also referred to in Unit-1). To use a simple example, consider the following proposition:

All planets orbit the sun (Major premise)

The earth is a planet (Minor premise)

Therefore, the earth orbits the sun (Conclusion).

The assumption underlying the syllogism is that through a sequence of formal steps of logic, from the general to the particular, a valid conclusion can be deduced from a valid premise.

In personal and professional life we very often use deductive logic in solving problems. Lawyers, doctors, soldiers, detectives often resort to deductive argument in their professional work. Research workers have been invariably using deductive reasoning to carry out certain tasks of their research work. Without deduction, facts obtained through observation and experiment would be fruitless since one could not fit them into deductive systems called sciences.

Limitations of deductive reasoning

Deductive reasoning has obviously its own limitation. Deductive conclusion depends upon pre-existing knowledge; it does not enable scholars to gain new knowledge or to make new discoveries. Deductive reasoning stresses on the forms of argument and not on the truth or falsity of the statements. According to the deductive mode of reasoning if the form of argument is sound, then even a false premise will not matter. Of course, this does not mean that deductive reasoning has no role in the knowledge generation process. Rather it has its own use in formulating and proposing hypotheses from the general truth (theory), this helps knowledge generation through enquiry by the use of hypothesizing. Deductive reasoning can systematize what is already known and can identify new relationships as one proceeds from known to unknown, but it cannot be relied upon as a self sufficient method for securing reliable knowledge.

2.3.5 Inductive Reasoning

We know that the conclusions reached by deductive reasoning are true only if they are derived from true premises. But the question is how to determine whether the premises are true. Inductive reasoning has been devised to complement deductive reasoning as a means of searching for knowledge. Particular instances (concrete facts) are observed in inductive reasoning and by examining these particular instances, a general conclusion is established about the whole class to which these particular instances belong. These general conclusions, arrived at through induction, may be used as major premises for deductive inferences.

Baconian induction

In the early 1600's, Francis Bacon introduced the mode of inductive reasoning. He felt strongly that deductive mode of reasoning could never suffice for discovery of truth because it started with a preconceived notion and, therefore, biased the results obtained. He declared that if one collected enough data without any preconceived idea about their significance and orientation, one is maintaining complete objectivity

about their significance and orientation, one could maintain complete objectivity about the process. Then, Bacon held, it was most likely that an inherent relationship — would emerge.

There may be two forms of induction – **perfect** and **imperfect**. Perfect induction establishes a conclusion by an exhaustive enumeration of all instances that are subsumable under a given class. All India Census operation is an example. Imperfect induction arrived at a generalization by observing only some instances, an adequate and representative sample from the entire class. The researchers in education and other social sciences utilize imperfect induction more often than perfect induction, for in most investigations it may not be possible to examine all the instances to which a conclusion refers.

Bacon's contribution to scientific progress is significant. He realized that advancement of knowledge was not possible only through deductive method. Increasing stress was to be laid on the observational basis of science. Bacon directed the attention of scientists to nature for solutions to peoples' problems, demanding empirical evidence for verification. Logic and authority in themselves were no longer regarded as conclusive means of proof and instead became sources of hypotheses about the world and its phenomena.

Limitations of inductive reasoning

Inductive reasoning has inherent limitations. Just as in the case of deductive reasoning, inductive reasoning also, only by itself, does not lead to much advancement of knowledge. Its basic limitation is that it can be applied to only as many events as can be observed, and hence the conclusions arrived at cannot really be infallible. The conclusions reached by imperfect inductive reasoning do contain information that is not present, even implicitly, in one of the premises (the observed instances). If all the premises (observed instances) are true, the probability of conclusions arrived at may be of varying degrees.

Check Your Progress

Notes: a) Space is given below for writing your answers.

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

1. List the sources of knowledge.

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2. What is syllogism?

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2.4 SCIENTIFIC METHOD

Francis Bacon planted the seeds of the modern scientific method of acquiring knowledge. He recommended that investigators reach conclusions on the basis of observed facts. In order to construct a more practical method of attaining reliable knowledge, scholars like Newton, Galileo, and their successors eventually combined

the deductive and inductive thought processes. This synthesis of reason and observation gave rise to the modern scientific method of generating knowledge.

2.4.1 Defining Scientific Method

If the most distinctive feature of science is its empirical nature, the next most important characteristic is its set of procedures which show not only how findings have been arrived at, but are sufficiently clear for others who are interested to repeat them, i.e. to check them out with the same or other materials and thereby test the result. A scientific approach necessarily involves standards and procedures for demonstrating the empirical warrant of its findings, showing the match or fit between its statements and what is happening or has happened in the world. These standards and procedures, taken together, form the scientific method. Thus, the scientific method is the way in which one can test opinions, impressions or guesses by examining the available evidence both for and against. It is simply the pursuit of truth, which is determined by logical considerations.

We see that the scientific method aims at discovering facts. But facts cannot be discovered without some reflective thinking and enquiry. When using the scientific method, man engages himself in a thinking process called 'reflective thinking'. Every fact is initially nothing but some proposition or problem. John Dewey in 'How We Think' analyzed the stages of the activity involved in the process of reflective thinking in the following five steps:

1. A felt difficulty – When one encounters a puzzling experience or problem.
2. Location and definition of the difficulty – when one makes observations, gathers facts, to specify the difficulty more concretely and precisely.
3. Suggested solutions of the problem or hypothesizing – when one, after a preliminary study of the facts about the problem, makes intelligent guesses about the possible solutions of the problem, which are called hypotheses.
4. Deductive reasoning - one formulates the consequences of the suggested solutions (hypotheses).
5. Testing the hypotheses – when one makes observations or collects evidences to confirm or disconfirm the hypotheses.

Here is how Kerlinger gives a graphic description of the above stages of the scientific method:

First, there is a doubt, a barrier, an indeterminate situation crying out so to speak, to be made determinate. The scientist experiences vague doubts, emotional disturbances, incoherent ideas. He struggles to formulate the problem, even if inadequately. He studies the literature, scans his own experience and the experience of others. Often he simply has to wait for an inventive leap of mind. May be it will occur; may be not. With the problem formulated, with the basic question or questions properly asked, the rest is much easier. Then the hypothesis is constructed, after which its implications are deduced. In this process the original problem, and of course the original hypotheses, may be changed. It may be broadened or narrowed. It may even be abandoned. Last, but not final, the relation expressed by the hypothesis is tested by observation and experimentation. On the basis of the research evidence, the hypothesis is accepted or rejected, this information is then fed back to the original problem and it is kept or altered as dictated by the evidence. What is important to note is the overall fundamental idea of the scientific method as a controlled rational process of reflective enquiry, the interdependent nature of the parts of the process, and the paramount importance of the problem and its statement.

2.4.2 Scientific Method combines Induction and Deduction

The steps in the act of reflective thinking as delineated in the previous section, reveal how induction and deduction serve as opposing processes of the total problem solving

act. Induction provides the ground work for hypotheses, and deduction explores the logical consequences of the hypotheses, in order to eliminate those that are inconsistent with facts, while induction again contributes to the verification of the remaining hypotheses. Thus, in an investigation, one continually shifts between collecting facts, making generalization (hypotheses) to explain facts, deducing the consequences of one's hypotheses, and seeking additional facts to test the hypotheses. By combining both induction and deduction, one is able to arrive at reliable knowledge.

It must be borne in mind that these steps of scientific method do not provide a rigid pattern into which scientists must mould their thinking, for thinking cannot simply be scheduled. Investigators rarely follow a prescribed sequence of procedure. Knowledge generation is often a confused, floundering process rather than a well-shaped logical, orderly one. In an investigation, one does not tackle one step at a time, completes that process, and then moves on to the next step. One may tackle the steps out of order, shuffle back and forth between steps, or work on two steps more or less simultaneously. Some steps may require little effort; other steps may take a disproportionate amount of time and effort.

What is most important to remember is that the scientific method is characterized by an inherent logic of its steps and procedures, which enables an investigator to pin his faith on it as a reliable tool for attaining truth and generating knowledge.

Limitations of scientific method

- It has to be appreciated that the scientific method does not consist merely of the application of the steps such as problem definition, hypothesizing collection of evidence, inferring and testing or verifying, but certain other factors like intuition, imagination, and chance have an undeniable role to play in any process of enquiry. In the history of scientific enquiry there is no dearth of examples to support this view.
- In respect of methodology for explorations of fields yet unknown, the limitation of the scientific method becomes obvious if one recognizes that it represents only a reconstructed logic and not logic-in-use as far as scientific explorations are concerned. According to Kaplan, a reconstructed logic is not a description but rather an idealization of scientific practice. Not even the greatest of scientists has a cognitive style, which is wholly and perfectly logical, and the most brilliant piece of research still betrays its all-too-human divagations. The logic-in-use is embedded in a matrix of an alogic-in-use, even an illogic-in-use. The reconstruction idealises the logic of science.
- Another argument made in adopting the scientific method is that it is only the outcome of applying the scientific method that can be considered as valid knowledge regarding the educational phenomenon. This methodological orthodoxy obviously raises more fundamental epistemological questions as to the role of empirical facts and experiences as tools of acquiring knowledge. Perhaps, an educational researcher needs to examine the underlying assumptions before wedding himself to the method he adopts. This is because the interpretation that a researcher would provide, even for his empirical findings, depends finally upon the philosophical and ideological position he takes.
- One cannot but observe that the situation presents a misconstrued notion that the law of scientific method has already been formulated and it remains for the researcher only to pick out a problem and apply it. This tendency puts a serious methodological limitation to educational research.

It encourages a view in which new methods or new ways of doing research would invariably be looked at with suspicion and hostility, eventually, it blocks attempts to create and invent new methods and techniques which become necessary with the

recognition of the fact that educational problems intrinsically vary from other fields of study such as physical and natural sciences.

Check Your Progress

Notes: a) Space is given below for writing your answers.

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

3. Define the scientific method.

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4. List steps of scientific method.

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2.5 LET US SUM UP

In this unit we have understood that there are several means of generating and acquiring knowledge, viz. experiences, authority, customs and tradition, Deductive and inductive reasoning, and the scientific method. We have noted that all these means have developed historically over time and each one has its own limitations as a source of generating knowledge. We have also seen that the scientific method combines inductive and deductive methods of reasoning, and hence its efficacy as a means of acquiring knowledge.

2.6 UNIT-END ACTIVITIES

1. Interview some senior students of a school and college to know from them what they learnt from following the customary and traditional practices like dressing, particular ways of behaving with children, peers and superiors. Analyze the content of the interview and bring out 'Customs and Traditions' as a source of acquiring knowledge in life.
2. Talk to some researchers in education and try to find out how they came upon their problems of research and how they attempted to systematically plan to study their problems. Analyze the content of your 'talk' and try to carve out the structure of the scientific method employed by the researchers in studying and solving their problems.

2.7 POINTS FOR DISCUSSION

1. Group discussions may be held on the following topics:
 - a) Life experience is a better source of acquiring knowledge than inductive and deductive reasoning.
 - b) Is the scientific method the best means of acquiring knowledge?
 - c) In modern days has the utility of 'Authority' as a means of knowledge generation been much reduced?

2.8 SUGGESTED READINGS

- Dewey John (1933): *How We Think?* Boston: D.C. Heath and Co.
- Cohen, Louis & Manion, Lawrence (1994): *Research Methods in Education*. Fourth Edition, New York: Routledge.
- Van Dalen, Deobold B. (1979): *Understanding Educational Research*. New York: McGraw Hill Book Company.
- Kaplan, Abraham (1969): *The Conduct of Enquiry: Methodology for Behavioural Science*. San Francisco: Chandler Publishing Company.

2.9 ANSWERS TO CHECK YOUR PROGRESS

1. Various sources of knowledge are:
 - Life experiences
 - Authority
 - Customs and tradition
 - Deductive reasoning
 - Inductive reasoning
 - Scientific method
2. A Syllogism can be described as a thinking process in which one proceeds from general to specific statements by deductive thinking. It provides a means of testing the validity of any given conclusion or idea by proceeding from known to unknown.
3. The Scientific method is a back-and-forth movement of thought in which man first operates inductively from partially known or sometimes confused information learned from experience, previous knowledge, observation and so on towards a meaningful whole or hypothesis, and then deductively from suggested whole or hypothesis to the particular parts in order to connect these with one another in a meaningful pattern to find relationships.
4. The five important steps of scientific method are:
 - i) Identification and definition of the problem.
 - ii) Formulation of a hypothesis.
 - iii) Testing and implication of hypothesis through deductive reasoning.
 - iv) Collection and analysis of evidences (data).
 - v) Verification, rejection, or modification of hypothesis.

UNIT 3 KNOWLEDGE GENERATION: HISTORICAL PERSPECTIVE-II

Structure

- 3.1 Introduction
- 3.2 Objectives
- 3.3 Positivistic Paradigm
 - 3.3.1 Aspects of Positivistic Paradigm
 - 3.3.2 Limitation of the Positivistic Paradigm
 - 3.3.3 Alternative Approaches to Development of Social Science Inquiry
- 3.4 Emergence of Field Methods
 - 3.4.1 Case Study Method
 - 3.4.2 Projective Techniques
 - 3.4.3 Anecdotal Records
- 3.5 Review (Rethinking) of Concepts and Constructs
 - 3.5.1 Objectivity
 - 3.5.2 Generalization
 - 3.5.3 Nature of Reality
- 3.6 Varied Studies in Education
 - 3.6.1 Relationship Studies
 - 3.6.2 Developmental Studies
 - 3.6.3 Understanding Studies
- 3.7 Studies in Education: Combination of Perspectives
- 3.8 Let Us Sum Up
- 3.9 Unit-end Activities
- 3.10 Points for Discussion
- 3.11 Suggested Readings
- 3.12 Answers to Check Your Progress

3.1 INTRODUCTION

In Unit 2, the earlier phase of knowledge generation process has been presented in a historical perspective. The later phase of this process will be dealt with in this unit. Knowledge generation through the scientific approach had a powerful impact on viewing the natural environment and improving the conditions of social life, consequently newer fields of study started coming up. Anecdotal records and projective techniques originated within the framework of scientific approach vis-à-vis this positivistic paradigm. In course of time, non-positivistic paradigm was becoming gradually more visible in social sciences and humanities in terms of meaning and interpretation of verbal behaviour, phenomenology, etc. This paradigm made many concepts and constructs, namely, objectivity, generalization, status of knowledge, nature of reality, etc look suspect. Education, having both the perspectives, cannot but recognize the emergence of such trends. Activities, processes, structures and phenomena in education, which is a very diverse field, got evolved through time. That is why educational scenario changes from time to time. Quite reasonable, therefore, that the studies visualized in education can be of varied kinds, like: relationships, developmental and understanding, rather than explanation and prediction.

These studies in education can be conducted meaningfully by utilizing varied perspectives of research. In an action situation, even a combination of paradigms may be relevant sometimes. This is what constitutes the content of this unit.

3.2 OBJECTIVES

After having studied this unit, you will be able to :

- discuss the meaning and the limitations of the positivistic paradigm (i.e. scientific approach).
- describe the new developments in social sciences and in education in terms of emergence of new areas of study, new concepts, constructs and new paradigm.
- understand the non-positivistic paradigm, e.g. phenomenological approach.
- appreciate that education has both the positivistic and phenomenological perspectives.
- understand that studies in education can be varied e.g. relationship, developmental and understanding type.
- realize that research in education may need to combine varied paradigms.

3.3 POSITIVISTIC PARADIGM

In order to explicate positivistic paradigm we have first to understand what a paradigm is. This term was introduced in 1962 by Thomas Kuhn in his book, "The Structure of Scientific Revolution". The concept has turned out to be useful in inspiring critical thinking about 'Sciences' and the way shifts in basic scientific thinking occur. A paradigm determines the criteria according to which one selects and defines problems for inquiry. A paradigm determines scientific approaches and procedures which stand out as exemplary to a new generation of scientists – as long as they do not oppose it. Kuhn characterizes a paradigm as: "An integrated cluster of substantive concepts, variables and problems attached with corresponding methodological approaches and tools..... A paradigm gathers into itself a community of investigators. By sharing information within itself, this community gives itself intellectual and social support. It tends not to communicate with investigators who follow different paradigms. Citation of other's work is frequent within a paradigm but much less frequent, perhaps non-existent across paradigms. Hence, the followers of a paradigm tend to have their own journals, scientific societies, and meetings, because the paradigm has won their allegiance to an integrated set of concepts, variables, problems, and methods."

A 'revolution' in the world of scientific paradigms occurs when one or several researchers at a given time encounter anomalies, for instance, make observations, which in a striking way do not fit the prevailing paradigm. Such anomalies can give rise to a crisis after which the universe under study is perceived in an entirely new light. Previous theories and facts become subject to thorough rethinking and re-evaluation.

Positivistic paradigm of knowledge generation is based on the philosophical ideas of the French philosopher, Auguste Comte, who turned to observation and reason as means of understanding behaviour. More simply, explanation proceeded by way of scientific description, it was Comte who consciously 'invented' the new science of society and gave it the name 'Sociology'. He thought that it would be possible to establish it on a 'positive' basis, just like the other sciences, which served as necessary preliminaries to it. For social phenomena were to be viewed in the light of physiological (or biological) laws and theories and investigated empirically, just like physical phenomena. Likewise, biological phenomena were to be viewed in the light of chemical laws and theories; and so on down the line.

Comte's position was to lead to a general doctrine of positivism which held that all genuine knowledge is based on sense experience and can only be advanced by means of observation and experiment. Following in the empiricist tradition, it limited enquiry and belief to what can be firmly established and in thus abandoning metaphysical and speculative attempts to gain knowledge by reason alone. Positivist paradigm developed what has been described as a 'tough-minded orientation to facts and natural phenomena'.

3.3.1 Aspects of Positivistic Paradigm

Positivistic paradigm has been defined in the last section. But its special features need to be explained. This is what follows.

Difficulty in Precise Meaning

Not only Comte but also many other scholars such as Bacon, Mill, Hume as well as the scholars of 'Vienna Circle' contributed to the development of the concept of positivistic paradigm. It is, therefore, difficult to assign it a very precise and consistent meaning. The term has also been applied to the doctrine of a school of philosophy known as 'logical positivism', originated by the scholars of Vienna Circle. Logical positivists hold that the meaning of a statement is, or is given by the method of its verification; unverifiable statements are, therefore, meaningless.

Assumptions Behind Positivistic Paradigm

Positivism derives its meaning from an acceptance of natural science as the paradigm of human knowledge. This has led to the development of the **scientific method** as a means of knowledge generation. Positivistic paradigm has, therefore, to be understood within the total framework of the principles and assumptions of Science.

First, there is the assumption of determinism, according to which events have causes and are determined by other circumstances; these causal links can eventually be uncovered and understood, and that the events are explicable in terms of their antecedents. The universe does not behave capriciously. It is the ultimate aim of the scientists to formulate laws to account for the happenings in the world around them, obtaining thereby a firm basis for prediction and control.

The second assumption is that of empiricism, which holds that certain kinds of reliable knowledge can only originate in experience which scientifically means that acceptance of a theory or hypothesis depends on the nature of empirical evidence for its support; 'empirical' here means that which is verifiable by observation. The viewpoint on empiricism may be summed up by saying that the best way to acquire reliable knowledge is the way of evidence obtained by direct experience. Thus, in an empirical science the scientist first gathers data on the basis of experience, then he classifies or if possible, quantifies data, tries to discover relationship in the classified and quantified data, and ultimately by gradual approximation he reaches the truth.

The third assumption underlying the work of the scientist is the principle of parsimony, the basic idea behind which is that phenomena should always be explained in the most economical way possible.

The fourth assumption is that of generality which forms the essential aspect of both the deductive and inductive methods of reasoning. Indeed, historically speaking, it was the problematic relationship between the 'concrete particular' and the 'abstract general' that resulted in two competing theories of knowledge – the rational and the empirical. Beginning with observations of the particular, scientists set out to generalize their findings to the world at large. This is so because they are concerned ultimately with explanation. Of course, the concept of generality presents much less of a problem to natural scientists working chiefly with inanimate matter than to human scientists who, of necessity having to deal with samples of larger human populations, have to exercise great caution when generalizing their findings to the particular parent populations.

Having identified the basic assumptions of science, we come to the core question: What is science? Science may be broadly defined as a way of comprehending the world, as a means of explanation and understanding, of prediction and control. Science is based on certain beliefs and assumptions which are briefly stated as under.

- (i) All events in nature are, at least to a degree, lawful and ordered, predictable and regular. This order, predictability and regularity of nature can be discovered through the activities of the scientific method.
- (ii) Truths can ultimately be derived only from observation. Science does not depend upon authority as a source of truth but relies upon empirical observation. Thus the phenomena that can actually be observed to exist are within the domain of the scientific method.
- (iii) The ultimate goal of science is to integrate and systematize findings into a meaningful pattern or theory which is regarded as tentative and not the ultimate truth. Theory is subject to revision or modification as new evidence is found.

Knowledge Generation Under Positivist Paradigm

Positivist paradigm has systematized the knowledge generation process, which proceeds as the development of a science: An area or a set of phenomena is brought under study or close scrutiny. Then the relevant factors and variables are identified. Research or study correlates the variables and parameters which may be found to be related to one another. Information about the phenomena under study is systematically integrated as theories begin to develop. If needed, the researcher may move from correlation to causality through systematic and controlled manipulation of variables (experimentation). This leads to establishment of a body of knowledge (theory) as the outcome of the study. Depending on the nature of the phenomena under scrutiny, laws may be formulated and systematized. Ultimately the established body of knowledge is used, according to necessity, in the resolution of problems or as a source of further enquiry.

3.3.2 Limitations of the Positivist Paradigm

In spite of the scientific enterprises' proven success, especially in the field of natural sciences, its ontological (theory of being or of existence) and epistemological (theory of knowledge) bases have been the focus of sustained and sometimes vehement criticism. Beginning in the second half of the nineteenth century, the limitations of the positivist paradigm were pointed out by the best intellectuals in Europe, that is, philosophers, scientists, social critics and creative artists; and even today opponents of positivism are made up of a similar cross-section, including many from within the ranks of the social scientists themselves. Essentially, it has been a reaction against the world picture projected by the positivist paradigm which, it is contended, devalues life and mind. The fundamental limitation of the positivist paradigm is that it reflects a mechanistic and reductionist view of nature which, by definition, excludes notions of choice, freedom, individuality, and moral responsibility. To quote a critique:

The positivist paradigm or for that matter the mechanistic science eliminates the concept of life itself. All they can do is to define life in terms of biochemistry, biophysics, vibrations, wave lengths, and so on; they reduce 'life' to conceivable measurement, but such a conception of life does not embrace the most evident element of all: that life can only be known by a living being, by 'inner' experience. No matter how exact measurement may be, it can never give us an experience of life, for life cannot be weighed and measured on a physical scale.

The Danish philosopher, Soren Kierkegaard, the proponent of existentialism, also pointed out the limitations of the positivist paradigm. Kierkegaard was concerned with individuals and their need to fulfill themselves to the highest level of development. This realization of a person's potential was for him the meaning of existence. But the

characteristic features of the age, that is, democracy's trust in the crowd mentality, the ascendancy of reason, scientific and technological progress – all militate against the achievement of this end and contribute to the dehumanization of the individual. Kierkegaard was convinced that people suffer from the illusion of objectivity which is one of the main masts of the positivistic paradigm. He wished to free people from this illusion. By 'objectivity' he meant the imposition of rules of behaviour and thought and the making of a person into an observer who is set on discovering general laws governing human behaviour. The capacity for subjectivity, he argued, should be regained. He regarded 'subjectivity' as the ability to consider one's own relationship to whatever constitutes the focus of enquiry.

The justification for any intellectual activity lies in the effect it has on increasing our awareness and degree of consciousness. This increase, some critics claim, has been retarded in our time by the excessive influence the positivistic paradigm has been allowed to exert on areas of our intellectual life. Thus, the positivistic paradigm demands that nothing must be regarded as real which cannot be founded by empirical science and rational methods, by 'objectivity'. Since the whole problem belongs to 'psychic reality', to man's 'inner world', to his moral being, and to the subjective life, there can be no debate unless we are prepared to recognize the serious limitations of positivistic paradigm and the failure of strict adherence to 'objectivity' to give an adequate account of existence.

The theoretical perspective with which the positivistic paradigm has dominated the social science scene, seeks the facts or causes of social phenomena with little regard for the subjective states of individuals. The positivist considers social facts or social phenomena as things that exercise an external and coercive influence on human behaviour. The positivist searches for facts and causes through methods such as survey, questionnaires, inventories and demographic analysis which produce quantitative data, and which allow him to statistically prove relationships between operationally defined variables. The positivist is not interested in the subjective nature of human behaviour and therefore reduces people to statistical aggregates. And these are no less serious limitations.

Many critics of the positivistic paradigm question the perspective adopted by positivist social science because it presents a misleading picture of the human being, this biased and restricted image of humans comes about because the social scientists (wedded to positivism) concentrate on the repetitive, predictable and invariant aspects of the person, on 'visible externalities' to the exclusion of the subjective world. Another limitation of the positivistic paradigm is that it fails to take account of our unique ability, as human beings, to interpret our experiences and represent them to ourselves. We can, and do construct theories about ourselves and our world; moreover we act on these theories. In failing to recognize this, positivism is said to ignore the world in which the meanings are developed by active subjects through their life experiences.

The findings of positivistic social science are often said to be of little consequence to those for whom they are intended, namely, teachers, social workers, counsellors, personnel managers, and the like. The more effort, it seems, the researchers put in to their scientific experimentation in the laboratory by restricting, simplifying and controlling variables, the more likely they are to end up with a 'pruned, synthetic and constructed version of the whole social reality'.

The limitations mentioned above are quite serious; but what alternatives have been shaped out to cope with these limitations? This is what is going to be outlined next.

3.3.3 Alternative Approaches to Development of Social Science Inquiry

The perspective of the researcher to view 'reality' and visualize appropriate modes of enquiry through which it can be observed, studied and understood, is heavily dependent

on the ideological position one holds about these basic concepts and processes. This fact is at the root of the evolution of different methods of research and methodological emphases. The anti-positivist movement in different disciplines of the social sciences is represented by three schools of thought – phenomenology, ethnomethodology and symbolic interactionism. A common thread running through the three schools is a concern with phenomena, that is, the things we directly apprehend through our senses as we go about our daily lives, together with a consequent emphasis on qualitative as opposed to quantitative methodology.

Phenomenology

In its broadest meaning, phenomenology is a theoretical point of view that advocates the study of direct experience taken at face value. It sees behaviour as determined by the phenomena of experience rather than by external, objective and physically described reality. E. Husserl and A. Schutz are the main proponents of this school of thought. The distinguishing features of this viewpoint are:

- a belief in the importance, and in the primacy of subjective consciousness;
- an understanding of consciousness as active, as meaning bestowing;
- a claim that there are certain essential structures to consciousness of which we gain direct knowledge by a certain kind of reflection. Exactly what these structures are is a point about which phenomenologists differ.

The phenomenologists believe that any phenomenon obtains because it is experienced. The experience provides meaningfulness to the phenomenon. The experience of individuals involved is, thus, an essential and integral part of the phenomenon. It is for this reason that the social phenomena (education included) unlike natural phenomena, have an important coordinate in human experience. The inclusion of this constituent of 'human experience' in the social phenomena makes them very different from natural phenomena. Therefore, the content of educational phenomena have to be viewed with this perspective which has direct implications for deciding the suitability and appropriateness of the mode of inquiry.

The process of experiencing involves the interaction between social environment and the individual. During such interaction another significant process comes into play, namely, 'interpretation', through which meanings to different actions or ideas are attached and the experience constructed. It is this meaningfulness arrived at through defining and interpreting that makes the phenomenon a 'reality'. Getting to know the process of interpretation by individuals requires the researcher to develop empathic understanding. It is through this ability that the researcher can reproduce in his mind feelings, motives and thoughts that are behind the actions of others. This requires a researcher to view the other person's behaviour from the point of view of that person.

To a phenomenologist, the situation under study is essentially unstructured, to which he has to give meanings through symbolic interaction and interpretation. In this process an individual's own consciousness plays an important role in comprehending the situation; relevant information, his perceptions of different elements in the situation, and a synthesized view of the situation, are utilized to arrive at perceiving symbolically meaningful objects which aid the process of understanding the situation. This demands taking into consideration the reaction of the individual, treating him as a person, and also knowing the perspective he holds, to view different elements of the situation for creating symbolically meaningful structures. Processing the situational data thus obtained leads to a gradual comprehension of it in the total context of the experienter. In fact, this emphasis on experience and thus on experienter's feelings and motives, makes objectification of data rather difficult and also unnecessary, since some relevant aspects of it are likely to be lost in the attempt of objectifying. It necessitates identifying and discerning the inner world of the individuals for understanding any phenomenon in the social and educational environment.

The essential structure of social phenomenon which involves social organization, social relationships, belief systems, value orientations, the resultant interactional patterns, refers to those elements which make the phenomenon. Individual's experience is an integral part of these elements. Also, the whole phenomenon is temporal and contextual. Any description of a social phenomenon made at a time, and in a given context of the larger social system, cannot be considered valid across varied conditions along the time dimension. Thus, the outcomes of pursuits of research with this perspective cannot be taken for generalizations in the form of context free or universal explanations. Moreover, it necessitates the need of reconstructing continuously what has been already studied, understood and described adequately. This feature of knowledge generation regarding social phenomena may throw light on the nature of knowledge and its structure in social sciences, and makes it distinct from the body of knowledge in natural sciences.

Ethnomethodology

Like phenomenology, it is concerned with the world of everyday life. In the words of its proponent, Harold Garfinkel, it sets out 'to treat practical activities, practical circumstances, and practical sociological reasonings as topics of empirical study and by paying to the most commonplace activities of daily life the attention usually accorded extraordinary events, seeks to learn about them as phenomena in their own right. He maintains that the students of a social world must doubt the reality of that world; and that in failing to view human behaviour more skeptically, social scientists have created an ordered social reality that bears little relationship to the real thing. Ethnomethodology, thus, is concerned with how people make sense of their everyday world. More especially, it is directed at the mechanisms by which participants achieve and sustain interaction in a social encounter – the assumptions they make, the conventions they utilize, and the practices they adopt. Ethnomethodology, then, seeks to understand social accomplishments in their own terms; it is concerned to understand them from within. In identifying the 'taken-for-granted' assumptions characterizing any social situation and the ways in which the people involved make their activities rationally accountable, ethnomethodologists use notions like 'indexicality' and 'reflexivity'; the former refers to the ways in which actions and statements are related to the social contexts producing them, while the latter refers to the way in which all accounts of social settings – descriptions, analyses, criticisms, etc. – and the social settings occasioning them are mutually interdependent.

The notion of symbolic interactionism, essentially derives from the work of G. H. Mead. The noted researchers such as Blumer, Hughes, Becker and Goffman were subsequently associated with this school of thought. It is possible to identify the following three postulates of this viewpoint:

First, human beings act towards things on the basis of the meanings they have for them. Humans inhabit two different worlds: the 'natural' world wherein they are organisms of drives and instincts and where the external world exists independently of them, and the social world where the existence of symbols, like language, enables them to give meaning to objects. This attribution of meanings, this interpreting, is what makes them distinctively human and social. Interactionists therefore focus on the world of subjective meanings and the symbols by which they are produced and represented. This means not making any prior assumptions about what is going on in an institution, and taking seriously, indeed giving priority to, inmates' own accounts. Thus, if pupils appear preoccupied for too much of the time – 'being bored', 'having a laugh', etc. the interactionist is keen to explore the properties and dimensions of these processes.

Second, this attribution of meaning to objects through symbols is a continuous process. Action is not simply a consequence of psychological attributes such as drives, attitudes, or personalities, or determined by external social facts such as social structure or roles, but results from a continuous process of meaning attribution which is always emerging in a state of flux and subject to change. The individual constructs, modifies, pieces together, weighs up the pros and cons and bargains.

Third, this process takes place in a social context, individuals align their actions to those of others. They do this by 'taking the role of the other', by making indications to 'themselves' about 'others' likely responses. They construct how others wish or might act in certain circumstances, and how they themselves might act. They might try to 'manage' the impressions others have of them, put on a 'performance', try to influence others' 'definition of the situation'.

Instead of focusing on the individual, and his or her personality characteristics, or on how the social structure or social situation causes individual behaviour, symbolic interactionists direct their attention at the nature of interaction, the dynamic activities taking place between people. In focusing on the interaction itself as a unit of study, the symbolic interactionist creates a more active image of the human being and rejects the image of the passive, determined organism. Individuals interact; societies are made up of interacting individuals. People are constantly undergoing change in interaction and society is changing through interaction. Interaction implies human beings acting in relation to each other, taking each other into account, acting, perceiving, interpreting, acting in relation to each other, acting again. Hence, a more dynamic and active human being emerges rather than an actor merely responding to others.

A Critical Overview of the Approaches

For the purpose of this overview, we term the phenomenological, ethno methodological and symbolic interactionist perspectives commonly, as the 'phenomenological perspective or approach and make the following observations.

1. The way in which 'reality' is perceived in social situations (education included) with the phenomenological perspective is an artifact, a construction of all the participants of a social situation which, however permanent it may appear to be, may be redefined and, therefore, changed. It is assumed that the human mind has an inherent capacity to define reality and interpret it and therefore, understand and describe it with related referents and contexts in which it operates. If it is further assumed, which many researchers do, that the whole process of defining 'reality' in its due context can be examined by another technical and willing person, and assuming still further that the two could have identical or similar orientations in perceiving reality, they are likely to arrive at similar conclusions. The strength of the argument lies in that even if they do not arrive at similar conclusions, this suggests some way to judge the validity of the approach.
2. If the position of the phenomenological perspective and the contribution of this approach to the process of knowledge generation are examined, one notices some ambiguity as an alternative approach to what positivists have suggested. The emphasis on the involvement of the observer and his perceptions leaves the whole process of research and its outcomes transitory.
3. The process through which the individual observer may form his perceptions, and even define the reality and understand it, leaves scope for giving emphasis upto some degree, to certain views or feelings and ideas that may be dear to him. In fact, this is an essential feature of the phenomenological approaches. This may allow not only the scope for utilization of ideas and concepts in defining and understanding in a detached manner but may also get reflected in the very understanding and description of the reality. This can easily happen when it comes to educational research which has implications for decision-making in various ways and social action. For instance, how equality of opportunity is defined and described in a social context cannot be free from one's views about certain matters which are of paramount importance socially and can lead to very varied conclusions depending upon how he utilizes his views for fixing the social parameters and develops the logical process to define it. At times, it may even run the risk of giving ventilation to the researcher's slanted views even if he is a

man of integrity because the cognitive process in him is not free from what he holds about a social situation and how he thinks others do about the same situation.

4. The foregoing observations about phenomenological approaches in general highlight mainly two points. One, these approaches emerged mainly as a strong reaction to the positivist approach of using the paradigm of natural sciences in social sciences. There is a powerful appeal in their argumentation in discarding the positivists' scientific method as inadequate and inappropriate to understand social phenomenon. While phenomenologists can be legitimately credited with highlighting some very essential aspects regarding reality and the process of describing it, a very perceptive mind in a researcher may easily find the points at which they are ambiguous, vague and less convincing as far as the adequacy of the approach to contribute to the process of knowledge generation is concerned. Two, the approaches advocated by the positivists and phenomenologists are based on very conflicting premises, and no doubt, each one holds some promise in the pursuit of knowledge generation. However, their inadequacies should suggest the scope for further thinking and continued search for new paradigms or modified ones to serve as more adequate tools of research.

Check Your Progress

Notes: a) Space is given below for writing your answers.

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

1. What is Positivistic Paradigm?

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2. List the limitations of the Positivistic Paradigm.

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3.4 EMERGENCE OF FIELD METHODS

To look into the emergence of field methods we first start with a question. How can knowledge of the ways in which children learn and the means by which schools achieve their goals be verified, built upon and extended? This is a central question for educational research. The problem of verification and cumulation of educational knowledge has been implicit in our discussion of the nature of educational inquiry in the foregoing sections. There, we have outlined two broad approaches to educational research. The first, based on the scientific (positivistic) paradigm, rests on the creation of theoretical frameworks that can be tested by experimentation, replication and refinement. Against this scientific, experimental approach, we have outlined an alternative perspective which has been described as interpretive and subjective, a focus we hasten to add that should be seen as complementing rather than competing with the experimental stance. In this section our presentation emphasizes the interpretive, subjective dimensions of educational phenomena that are best explored by case study method, projective technique and anecdotal records method.

Emergence of these methods which may be considered as 'field methods' is, thus, a fall-out of the acceptance of interpretive approaches in social science research. Since the scope of controlled experiment is very limited in social sciences, the use of "natural experimentation" or "field methods" is the most reasonable way-out. Under these methods, the researcher has to make a field study or survey in order to collect research materials or data. The phenomenon is empirically studied and examined, and a conclusion is finally arrived at regarding the cause and effect of the phenomenon. Obviously all these methods are based on observation. Consequently 'field method' is a somewhat open-ended term that concerns not only techniques but also methodology and research procedure. The various elements involved might be defined as follows: 'general methodology' concerns the systematic and logical study of the general principles guiding an investigation. 'Research strategy or research procedure' refers to the way a particular investigation is designed and carried out. 'Research technique' is a particular fact-finding manipulative operation that is used to yield social data. In these three distinct aspects of 'field method' are brought together in the research process as they are intertwined with each other in the course of any social investigation. 'Field method' is not an exclusive method in the same sense, as say, experimentation is. Field methods are more like an umbrella of activities beneath which any technique of research may be used for gaining the desired information regarding the investigation.

3.4.1 Case Study Method

Case study can be defined as an indepth study which is concerned with pertinent aspects of a particular unit or situation. The unit under study may be an individual, a social institution or an agency such as a family, a library, a school, a college, or a rural village, etc. The case to be studied may be some phase of the life history of the unit of attention, or it may represent the entire life history or total functioning of the individual unit. Thus, the case study method involves the collection and recording of data about a case. The collection of data on site is termed as 'field-work', and it involves:

- (a) generally, participant or non-participant observation and interviewing;
- (b) probably, the collection of documentary evidence and descriptive data, and even the administration of tests or questionnaires; and
- (c) possibly, the use of photography, motion pictures or videotape recording.

Thus, whatever the problem or the approach, at the heart of every case study lies a method of observation-participant or non-participant. In participant observation, observers engage in the very activities they set out to observe. Often their 'cover' is so complete that as far as the other participants are concerned, they are simply one of the group. To have better insight into the life of a gang of juvenile delinquents, going to live with them for an extended period of time, is a good example of participant observation. Non-participant observers, on the other hand, stand aloof from the group activities they are investigating. The best illustration of the non-participant observer role is perhaps the case of the researcher sitting at the back of a classroom coding up every three seconds the verbal exchanges between the teacher and the pupils by means of a structured set of observational categories.

The critics of participant observation as applied to case study or any other field method point out that observers may lose their perspective and become blind to the peculiarities that they are engaged to be investigating. These criticisms raise questions about two types of validity in observation-based research. In effect, comments about the subjective and idiosyncratic nature of the participant observation study are to do with its external validity. How do we know that the results of this one piece of research are applicable to other situations? Fears that observers' judgment will be affected by their close involvement in the group relate to the internal validity of the method. How do we know the results of this one piece of research represent the real thing, the genuine product?

Many educational problems involve such a complex interaction of variables that there seems to be an urgent need for analyses based on close observation. Case study method may be seen as a response to this need for a return to close natural observation, or as a reaction against the positivist epistemology implied in the psychostatistical paradigm. Case study methods are often described as naturalistic, qualitative, descriptive, responsive, interpretative or idiographic by way of contrast to the abstracted, quantitative nomothetic approach of psychostatistical methods that strip observation to indices.

3.4.2 Projective Techniques

Projective techniques are used to probe areas that cannot be reached easily by other means or areas in which direct questions are apt to elicit distorted data. Instead of asking a subject for specific information, an investigator has to interpret or respond freely to ambiguous stimuli, such as ink-blot, pictures, unfinished sentences, work associations or life like dramatic roles. Each of the above mentioned types of stimuli has given rise to a particular type of projective test or technique, such as Thematic Apperception Test, Rorschach Test, Ink-blot Test, Word Association Test, etc. Through self-structured, spontaneous responses, the subject unconsciously reveals manifestations of his personality characteristics and organization. Only highly trained workers can interpret the implications of these responses, and scoring them is laborious. Projective tests are difficult to validate, and many of the tools have not been standardized. Some weaknesses in them are being overcome, but much work remains to be done.

3.4.3 Anecdotal Records

In order to have better insight into certain unusual aspects of emotional and social behaviour of pupils the teachers and the counsellors keep anecdotal records in schools in a cumulative way. Thus, anecdotal materials have come to be a significant part of evaluating and counseling activities in schools. A type of cumulative individual record which emphasizes episodes of behaviour important in the development of character or personality is known as anecdotal-behaviour journal. These anecdotes include not only maladjustment, but also positive and constructive episodes, the admirable behaviour of well-adjusted pupils, and the outstanding accomplishments of the superior or talented. The anecdote as a revealing episode of conduct is in the form of a work picture or verbal snap-shots. To be most helpful, anecdotes should possess the characteristics of objectivity, factual emphasis, clarity and subjectivity (in the sense that an artistically composed photograph is subjective, with a centre of attention and with subordination of inconsequential details). Anecdotal records serve useful purposes by way of mutual understanding between teachers and pupils, counselling relationships, curriculum development, appraisal of learning outcomes and case instructions in professional programmes for preparing teachers and others.

Check Your Progress

Notes: a) Space is given below for writing your answer.

b) Compare your answer with that given at the end of the unit.

3. Name at least three field methods.

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3.5 REVIEW (RETHINKING) OF CONCEPTS AND CONSTRUCTS

Before reviewing or rethinking of the significant concepts and constructs involved in the process of educational research we would, first, like to clarify our ideas about these terms (concept and construct).

Concept

Language consists of words and sentences.

To the words of ordinary speech correspond the concepts. Words of language refer to characters or attributes of individual things or to relations among them. All such words are called 'descriptive' terms. Those with name, not individual things, but their characters and relations, are concepts of science. Conceptualization or the process of concept formation is essential to the processes of thinking and scientific technique, since it renders precise meaning for communication and brings about economy in the use of language. Concepts are not only basic to scientific method, but they are the foundation of all human communication and thought. In a science, as in educational research, concepts must be communicable in a special sense. They must be formed in such a way that their components are known. Clarification of the elements of such concept-formation is the main function of definition, which is considered basic to the general problem of conceptualization. The process of communication becomes difficult between individuals who do not share the conceptual system. Concepts, it seems to be clear now, develop from a shared experience. The development of a conceptual system is very much like the development of a new language, and this goes hand in hand with any research process.

Construct

We frequently make inferences from observations to something not observed. In order to explain certain manifest behaviour, the scientist formulates concepts that name unobserved states of the organism or object exhibiting the observed behaviour. He postulates certain lawful connections between these 'underlying states' and the observed behaviour. These 'inferred' characters are called **constructs**. Sometimes they are referred to as hypothetical constructs, to indicate that they are not considered real objects or events. Most theories of behaviour involve constructs. Terms such as intelligence, motivation, inhibition, mediation, etc. refer to constructs, which are the abstract elements of a theory.

One important consideration in systematizing the research process is to look into the nature of constructs regarding educational phenomena and their operationalisation. When constructs are operationalised, precision and accuracy in their measurement are attained. This also helps in formulating hypotheses in testable forms. But one should remember, operationalisation can be attempted if the constructs under study are of such a nature that they can be observed to operate with respect to certain concrete referents under specified conditions. This demands a fair amount of stability in these referents and their functioning under specified conditions. But, in educational research certain constructs are of such a nature that they do not come under conceptualization from situation to situation with the same structure and form, and to that extent, are not amenable to concretization through research in the same way as it could be done in certain other fields of inquiry viz. physical sciences. As an illustration, teaching effectiveness is one such construct. In a study on teaching effectiveness, it can be seen that operationalising this construct to be applicable to all possible teaching-learning situations will be almost impossible, because teaching effectiveness is determined by a large number of criteria pertaining to the teacher, learners as well as the teaching-learning context. Moreover, there will be several alternative ways of organizing the

teaching-learning process in a given situation, may be quite effective ones which could lead to the attainment of criteria fixed for effectiveness. This happens mainly because of human interaction involved in the situation, and many other related variables coming into play. Thus, to come out with a stable concept of teaching effectiveness valid for all situations can hardly be attempted. This puts a serious constraint on theorization about teaching effectiveness. This illustration makes it clear that constructs in education may be found, but these cannot be operationalised to an adequate degree of specificity and concreteness. Recognition of this peculiar nature of some of the constructs in educational research will have important implications for different aspects of research methodology.

Rethinking of concepts and constructs is necessary in the research process of any discipline as a continuing knowledge generation process. So is the case in educational research. A continuous process of research will throw new insights into the basic processes and relationships involved in inquiry in the emerging context which have to be fed into the process of evolving newer concepts, structures and models in order to respond to the new demands put on the education system by the evolving society.

We know in research dependable evidences need to be collected through the a scientific process. And, this scientific process of collecting evidence in order to back up decisions regarding various educational practices constitutes what is known as the methodology of educational research. Research methodology in education is a complex process, mainly because the solution to educational problems involves a variety of factors related to many other fields affected by change and development in the life of the individual and the society. In fact, the researcher in education has to face many questions, problems or issues in dealing successfully with the research task. There are theoretical-conceptual issues and problems of methodology that he has to keep clearly in view to respond adequately and logically to the requirements of research tasks. Very often it is seen that lack of proper understanding of such concepts and issues makes even a well-defined research study indefensible at the completion of enquiry. The purpose of the present section is to highlight a few of such methodological concepts and issues in educational research.

3.5.1 Objectivity

Objectivity is a very important concept in educational research. Doubt is raised about the objectivity of observations made or evidence collected. In one way, objectivity is defined as agreement among expert judges on what is observed. The Positivistic view holds that scientific procedures of educational research should not be vitiated by human concerns, because all forms of knowing (such as observation) are biased by values, attitudes, etc. of the human observer. It seems, therefore, that it is not possible ever to be completely objective. In other words, objectivity is a matter of degree. But, if evidence is to be dependable, a criterion of objectivity is indispensable. The educational researcher can use one test of objectivity, i.e. replicability. This means that from the description of a research study, another competent investigator can replicate it. Methodologically, this gives a rule: All procedures of research must be replicable as well as possible to be carried out apart from the investigator. The educational researcher has to ultimately accept it that there are no absolute truths. We cannot know anything absolutely. We have to admit this limitation of research technique, such as observation also. There are only relative degrees of reliable and valid knowledge about the procedures and techniques in educational research. For the educational researcher the promising aspect is that objective procedures increase the probability of obtaining more reliable and valid knowledge from research.

3.5.2 Generalization

No researcher is interested solely in the collection of data, for he will want to derive statements that are true for situations other than those in which the data were collected.

For instance, if a teacher of educable mentally challenged children were to develop a remedial instruction programme for reading and aimed to demonstrate that a group of such children learned to read substantially and significantly more rapidly than a group of similar children exposed to mere typical reading instruction, the teacher would then be concerned with asking whether similar results would be found if the remedial programme is used with other groups. The teacher wants to make general statements from the data of other sample groups, because his study would be of little importance if the method is effective only with the group studied and not with other groups. We are assuming here that the teacher is objectively reporting the result (as is expected of every researcher), for, if he were not, he might be content with having discovered the fact that the remedial programme was an effective one for his particular class and leave the matter at that. The researcher never stops with data, he is always concerned with deriving general statements that can be applied to other situations. Thus, conclusions of an inquiry, if they are to be applicable to more than the particular context of the inquiry, are stated as generalizations. The content of the generalization can be specified only in terms of its place in a more comprehensive system of propositions. A simple generalization moves from a set of propositions about a number of individual cases to all cases of that class. An extensional generalization moves from a narrower class to a broader one. Both these types are likely to be only descriptive. A theoretical generalization is fully explanatory. A valid generalization derived from data is sometimes referred to as a law, although the term 'law' is more commonly used in the physical sciences than in the behavioural sciences, perhaps because the behavioural scientists have difficulty in determining what is and what is not a valid generalization. Generalizations or laws must be such that they can be used to predict events. Generalizations that can be used only for accounting for past events provide what are called postdictive systems; the generalizations developed by the scientists must be predictive. A theory consists of a group of generalizations that together account for particular classes of phenomena. The theory is stated in simple and precise terms. It must be in conformity both with the observed and with the previously established body of knowledge or validated theories. A theory provides means for its own interpretation and verification. The statements or generalizations that form the body of a theory are sometimes referred to as the postulates of that theory. It sets out constructs, definitions or propositions in order to present a systematic view of the phenomena.

The possibility of valid generalization is a nagging question in educational research. In educational research, as in any other field, there have been attempts to arrive at generalization regarding certain relationships. To arrive at such generalizations the usual methodology is to go for large samples including a variety of situations in educational settings. The essential feature of this approach is to make controlled observations, as it is done in laboratory type experimentations, aiming at discerning the effects of certain selected variables on certain others under specified conditions, keeping all other factors non-operative or neutralizing their effects. In case of teaching-learning situations, for example, studies of this sort are quite significant as they increase the understanding of certain basic relationships in the teaching-learning process. These relationships would form the basis of selecting suitable inputs and processes to be incorporated into the instruction for various levels. However, the application of these selected inputs and processes to actual teaching-learning situations, may make their operations substantially different as the situations would become complex due to the inter-play of innumerable variables. This complexity of situation is due to the fact that certain controls which were exercised under the laboratory type experimentation are no longer operative in actual teaching-learning situations. The interplay among numerous organismic and environmental variables would make each teaching-learning situation acquire a great deal of uniqueness. Proper understanding of these situations would demand employing a methodology to treat each unique teaching-learning situation, or a few very similar ones, separately, and bring them under investigation in an intensive

manner, for studying the complex dynamics presented by a variety of variables. Such studies would warrant limited generalizations to the situations that may be considered very close to these studies. This is particularly significant in the light of the methodological consideration that if attempt is made for wider generalizations across the situations, it would be only on the basis of elements common to the interplay in different situations. Since these interplays among variables are unique in many ways, such commonalities may be very meager and would, thus, prevent meaningful generalizations. But, these limited generalizations would be of substantial assistance in concretizing the different educational sub-systems suited to each of these situations. Further, in the long range, when a number of situations representing different sets of conditions are intensively studied, perhaps, a better scope would be provided by the outcomes of these studies for attempting wider generalizations; this would have to be done through a very analytical study of the processes that have been brought out as being operative in individual studies. Such an approach where the complex interplays as obtained in individual situations are studied in an intensive manner would require that the studies be designed in such a way that a variety of variables and their interplay can be subjected to systematic observations and their effects can be discerned.

3.5.3 Nature of Reality

Ever since the methods of social sciences have been applied to the study of education and its problems, a controversy and debate has resulted. Educational research has at the same time absorbed two competing views of social sciences – the established, traditional view and a more recently emerging radical view. The former holds that the social sciences are essentially the same as the natural sciences and are therefore concerned with discovering natural and universal laws regulating and determining individual and social behaviour; the latter view, however, while sharing the rigour of the natural sciences and the same concern of traditional social science to describe and explain human behaviour, emphasizes how people differ from inanimate natural phenomena and, indeed, from each other. These contending views – and also their corresponding reflections in educational research – stem in the first instance from different conceptions of social reality and of individual and social behaviour.

The two views of social science as outlined above, represent strikingly different ways of looking at social reality and are constructed on correspondingly different ways of interpreting it. We can perhaps most profitably approach these two conceptions of the social world by examining the explicit and implicit assumptions underpinning them. First, the ontological assumptions which concern the very nature or essence of the social phenomena being investigated get expressed through a few questions. Is social reality external to individuals – imposing itself on their consciousness from without – or is it the product of individual consciousness? Is reality of an objective nature, or the result of individual cognition? Is it a given 'out there' in the world, or is it created by one's own mind? These questions spring directly from what is known in philosophy as the nominalist – realist debate. The former view holds that objects of thought are merely words and that there is no independently accessible thing constituting the meaning of a word. The realist position, however, contends that objects have an independent existence and are not dependent for it on the knower.

The second set of assumptions is of an epistemological kind. These concern the very bases of knowledge – its nature and forms, how it can be acquired, and how communicated to other human beings. The question is: whether it is possible to identify and communicate the nature of knowledge as being hard, real and capable of being transmitted in tangible form, or whether knowledge is of a softer, more subjective, spiritual or even transcendental kind, based on experience and insight of a unique and essentially personal nature. The epistemological assumptions in these instances determine extreme positions on the issues of whether knowledge is something which can be acquired on the one hand, or is something which has to be personally experienced on

the other. How one aligns oneself in this particular debate profoundly affects how one will go about uncovering knowledge of social behaviour. The view that knowledge is hard, objective and tangible will demand of the researcher an observer role, together with an allegiance to the methods of natural science; to see knowledge as personal, subjective and unique, however, imposes on researchers an involvement with their subjects and a rejection of the ways of the natural scientist. To subscribe to the former is to be positivist; to the latter, anti-positivist.

The third set of assumptions concern human nature and, in particular, the relationship between human beings and their environment. Since the human being is both its subject and object of study, the consequences for social science of assumptions of this kind are indeed far-reaching. Two images of human beings emerge from such assumptions – the one portrays them as responding mechanically to their environment; the other, as initiators of their own actions.

It would follow from what has been said so far that the three sets of assumptions identified above, have direct implications for the methodological concerns of researchers, since the methodological concerns of researchers, since the contrasting ontologies, epistemologies and models of human beings will in turn demand different research methods. Investigators adopting a positivist approach to the social world and who treat it like the world of natural phenomena as being hard, real and external to the individual will choose from a range of traditional options – surveys, experiments, and the like. Others favouring the more subjectivist (or anti-positivist) approach and who view the social world as being of a much softer, personal and humanly-created kind will select from a comparable range of recent and emerging techniques – accounts, participant observation, unstructured interview, etc. The former approach to research is more quantitative and nomothetic, while the latter is more qualitative and idiographic.

Thus, each of the two perspectives on the study of human behaviour and the nature of reality has profound implications for research in social and behavioural sciences. The choice of problem, the formulation of questions to be answered, the characterization of the respondents, the kinds of data sought and their mode of treatment – all will be influenced and determined by the viewpoint held.

3.6 VARIED STUDIES IN EDUCATION

Varied studies are possible in education. The type of a study will depend upon the purpose the educational researcher has set for himself to attain. His problem may be to know the status of some aspect of education for which he would launch a 'survey study'. He may like to know how certain aspects of education are related with certain other aspects, and he may undertake a 'correlational study'. Or, he may aim at understanding the inner dynamics of an educational phenomenon for which he needs to take up an 'experimental study' of the variables of the phenomenon to know how, which way or why they function under the situation for study. The methodology of the type of studies will obviously differ accordingly. We present here a brief outline of three major types of educational studies.

3.6.1 Relationship Studies

Human behaviour at both the individual and social level is characterized by great complexity. Given the present state of educational research, we understand comparatively little about this complexity. One approach to a fuller understanding of human behaviour is to begin by testing out simple relationships between those factors and elements deemed to have some bearing on the phenomena in question. The value of relationship studies is that these are able to achieve this end.

One of the primary purposes of science as it is traditionally conceived is to discover relationships among phenomena with a view ultimately to predicting and, in some

situations, controlling their occurrence. Much of educational research is concerned primarily with establishing interrelationships among variables. For instance, we may want to know how delinquency is related to social class background; or whether an association exists between the number of years spent in fulltime education and subsequent annual income; or whether an association exists between achievement and learner's parental background. Numerous techniques have been devised to provide us with numerical representations of such relationships which are known as 'measures of association or correlation'. Some of such measures of association are given by product-moment correlation, rank-order correlation, phi coefficient, etc. Correlational techniques are generally intended to answer three questions about two variables or two sets of data. First, 'Is there a relationship between the two variables (or sets of data)?' If the answer to this question is 'yes', then two other questions follow: 'What is the direction of the relationship?' and 'What is the magnitude of association?' Relationship in this context refers to any tendency for the two variables (or sets of data) to vary consistently. Pearson's product-moment coefficient of correlation, one of the best known measures of association, is a statistical value ranging from -1.0 to +1.0 and expresses this relationship in quantitative form. Where the two variables (or sets of data) fluctuate in the same direction, i.e., as one increases so does the other, or as one decreases so does the other, a positive relationship is said to exist. A negative correlation or relationship, on the other hand, is said to exist when an increase in one variable is accompanied by a decrease in the other variable. Zero correlation means that a person's performance on one variable is totally unrelated to his performance on a second variable. Other measures exist, however, which allow us to specify relationships when more than two variables are involved. These are measures of 'multiple correlation' and 'partial correlation'. Multiple correlation, or 'regression' as it is sometimes called, indicates the degree of association between variables. Partial correlation aims at establishing the degree of association between two variables after the influence of a third variable has been controlled or 'partialled out'.

It is clear now that relationship studies comprise those studies in which attempts are made to discover or clarify relationships through the use of correlation coefficients. Relationships thus disclosed may simply indicate what goes with what in a given context, or else they may provide a basis on which to make predictions about the variables being studied. The basic design of relationship studies is simple and involves collecting two or more sets of scores on the same group of subjects and computing correlation coefficients. Many useful studies in education have been based on this simple design. Those involving more complex relationships, however utilize multiple and partial correlations in order to provide a clearer picture of the relationships being investigated. One should remember that the quality of relationship studies is determined not by the complexity of the design or sophistication of the correlational techniques used but by the level of planning and the depth of the theoretical constructs going into the development of the hypotheses. It also should be borne in mind that correlation refers to measures of association and does not necessarily indicate causal relationships between variables.

Relationship studies may be either exploratory or predictive. Exploratory relationship study may be particularly useful in the fields where little or no previous research has been undertaken. Frankly speaking, it is often a shot in the dark aimed at verifying hunches a researcher has about a presumed relationship between characteristics or variables in the educational situation. For example, let us take a complex notion like 'teacher effectiveness'. This is dependent upon a number of less complex factors operating singly or in combination. Factors such as intelligence, motivation, perception of the teacher, verbal skills and empathy come to mind as possibly having an effect on teaching outcomes. A review of research literature will confirm or reject these possibilities. Once an appropriate number of factors have been identified in this way, suitable measures may then be chosen or developed to assess them. They are then given to a representative sample and the scores obtained are correlated with a measure

of the complex factor being investigated namely, teacher effectiveness. As it is an exploratory undertaking, the analysis will consist of correlation coefficient, only, though if it is designed carefully, we will begin to achieve some understanding of the particular behaviour being studied. The investigation and its outcomes may then be used as a basis for further research or as a source of additional hypotheses.

Exploratory relationship studies may also employ partial correlational techniques. Partial correlation is a particularly suitable technique when a researcher wishes to nullify the influence of one or more important factor upon behaviour in order to bring the effect of less important factors into greater prominence. If, for example, we wanted to know more fully the determinants of 'academic achievement' in schools, we might begin by acknowledging the importance of the factor of intelligence and establishing a relationship between intelligence and academic achievement. The intelligence factor could then be held constant by partial correlation, thus enabling the investigator to clarify other, lesser factors such as motivation, parental encouragement or vocational aspiration. Clearly, motivation is related to academic achievement but if a pupil's motivation score is correlated with academic achievement without controlling the intelligence factor, it will be difficult to assess the true effect of motivation on achievement because the pupil with high intelligence but low motivation may possibly achieve more than pupils with lower intelligence but higher motivation. Once intelligence has been 'partialled out', it is possible to see more clearly the relationship between motivation and achievement. It is worth mentioning that exploratory relationship studies may employ sophisticated multivariate techniques in delving out associations between dependent and independent variables.

In contrast to exploratory relationship studies, prediction studies are usually undertaken in areas having a firmer and more secure knowledge base. Prediction through the use of correlational techniques is based on the assumption that at least some of the factors that will lead to the behaviour to be predicted are present and measurable at the time the prediction is made. In order to be valuable in prediction, the magnitude of association between two variables must be substantial, and the greater the association, the more accurate the prediction it permits. Most efforts to predict future behaviours, however, are based upon a number of predictor variables, each of which is useful in predicting a specific aspect of future behaviour. In the prediction of college success, for instance, a single variable such as academic achievement is less effective as a predictor than a combination of variables such as academic achievement together with, say, motivation, intelligence, study habits, etc. More complex studies of this kind, therefore, generally make use of multiple correlation and multiple regression equations. One final point: correlation is a group concept, a generalized measure that is useful basically in predicting group performance. For instance, it can be predicted that gifted children as a group will succeed at school, but it cannot be predicted with certainty that one particular gifted child will excel.

3.6.2 Developmental Studies

Developmental studies have a two-fold meaning in the context of educational research.

Meaning – One

The term 'developmental' is primarily biological, having to do with the organization and the life process of living things. The concept has been appropriated and applied to diverse social science phenomena. In education, developmental studies retain the original biological orientation of the term, having to do with the acquisition of motor and perceptual skills in young children. However, the designation 'developmental' has wider application in education, for example, in connection with Piagets' studies of qualitative changes occurring in children's thinking, and Kohlberg's work on moral development.

Developmental studies are primarily concerned with time trends; that is to say, with changes that occur as a function of time. Developmental studies are of such far-reaching consequence for education that research of this type must assume a place of great importance. We must not forget that the central task of education is that of producing development. Some of the most important problems of education involve time trends, for education itself is concerned with personal change and with the control of learning as it occurs in pupils. Even though the classroom teacher is mainly concerned with change over a relatively short period of time, such as a decade or a life time. Classroom examinations given at the end of a semester are limited studies of development in which increments in an area of intellectual skill are studied over a short period of time, perhaps without recognizing that change may not be permanent but will undergo a period of waning and waxing as time goes by. The latter type of problem has come to be of increasing importance as educators have extended their interest in educational problems from the childhood years to the entire life span.

The term 'longitudinal' is used to describe a variety of developmental studies that are conducted over a period of time. Often, as we have seen, the word 'developmental' is employed in connection with longitudinal studies that deal specifically with aspects of human growth. A clear distinction is drawn between longitudinal and cross-sectional studies. The longitudinal study gathers data over an extended period of time; a short-term investigation may take several weeks or months, a long-term study can extend over many years. Where successive measures are taken at different points in time from the same respondents, the term 'follow-up study' or 'cohort study' is used.

Where different respondents are studied at different points in time, the study is called cross-sectional. A cross-sectional study is one that produces a 'snapshot' of a population at a particular point of time. The epitome of the cross-sectional study is a national census in which a representative sample of the population consisting of individuals of different ages, different occupations, different educational and income levels, and residing in different parts of the country, is interviewed. More typically in education, cross-sectional studies involve indirect measures of the nature and rate of changes in the physical and intellectual development of samples of children drawn from representative age levels. The single 'snapshot' of the cross-sectional study provides researchers with data for either a retrospective or a prospective enquiry.

Trend studies (as developmental studies) have an obvious importance to educational administrators or planners. Like cohort studies, they may be of relatively short or long duration. Essentially, the trend study examines recorded data to establish patterns of change that have already occurred in order to predict what will be likely to occur in the future. A major difficulty the researchers face in conducting trend analysis is the intrusion of unpredictable factors that invalidate forecasts formulated on past data. For this reason, short-term trend studies tend to be more accurate than long-term analysis.

Longitudinal developmental studies of the cohort analysis type have an important place in the research armory of educational investigators. Cohort studies of human growth and development conducted on representative samples of populations are uniquely able to identify typical patterns of development and to reveal factors operating on those samples which include other research designs. The strength of cohort studies in schools is that they provide longitudinal records whose value derives in from the known fallibility of any single test or assessment. Time is generally more readily available in cohort studies, allowing the researcher greater opportunity to observe trends to distinguish 'real' changes from chance occurrences.

Though longitudinal studies are useful in accumulating data for the same subject or subjects at various levels and help in intensive studies of individual or individuals, they have sampling weaknesses. The data in these studies are obtained from a single individual or a limited number of individuals. If the sample selected proves to be a poor

one, there is nothing that can be done to it, nor can new longitudinal variables for investigation be introduced after the completion of the study. Longitudinal studies may give accurate descriptions of the growth of the individuals studied, but these data are not necessarily representative of the total population from which the individuals are selected. It also becomes extremely difficult to get the data in continuity from the individuals who are selected from a mobile community. Sometimes longitudinal studies become unwieldy and unmanageable because of the wide range of behaviour to be observed, large number of the subjects in the sample, or less duration of the time period in which the study has to be completed. To overcome this difficulty, the study should not be conducted by one individual but a group of researchers.

Meaning – Two

In education laboratory type controlled studies alone cannot provide the full picture of the operation of innumerable variables in an educational situation which essentially goes on in a social context. This leads to a position that studies may have to be conducted in real educational setting without going for any control which may render the situation artificial and its understanding less meaningful. However, at the same time these studies may have to be so conducted that systematization and objectivity of approach will not be in any way jeopardized. Such studies are referred to as 'developmental' studies. Findings generated from other types of studies are further investigated into in real educational situations which form the content of developmental studies. The relevance and placement of developmental studies are better understood if one looks into the 'research and development' ('R and D') efforts made in various industries. The major purpose of 'R and D' is to generate new practices in laboratory conditions and through concerted efforts gradually introduce them to the field. In instruction, development studies are concerned with development of instructional materials, working out applications, evolving models, etc., and also studying relevant relationships among various organismic and environmental variables operating in real educational situations. The significance of developmental studies in instruction is two-fold. It not only increases the applicability of educational practices in specific situations, but also helps in generating fuller insight into the instructional process. Nomenclatures like 'field studies', 'a-experimentation', etc., have been used to specify the developmental studies. However, in all such cases these efforts are described as investigators either to study the functioning of models, inputs, devices, etc., in the natural setting or to examine the interrelationships existing among a wide range of variables in real instructional situations or both.

The developmental studies aim at evolving models, inputs, materials in instruction with increased applicability in real situations, as well as generating a fuller understanding regarding the instructional process. Designing such studies must see that scientificity may not be sacrificed. Rather, the efforts should be to identify and develop designs suitable for the nature and purpose of developmental studies. This would involve development of hypothetical systems and subjecting them to continuous tryout in specific settings, collecting evidences from varied sources regarding their effectiveness and feasibility, and bringing about modifications in various aspects of the system. Such a design of evolving an instructional system suitable to specific social contexts is originated from the concept of systems approach and systems analysis. Basically, systems analysis involves the various steps of the scientific method such as generating hypothetical plans of action which are subjected to testing and modification. A major problem that a researcher while evolving instructional systems would face is the ways and means by which he can collect evidences, in a comprehensive and holistic manner, from various personnel and situations related to the system. Techniques of 'retrospective interviewing' might be used to trace the origins of observed phenomena. There is no opportunity in such methods to control variables or to restrict the number of cases to be examined. Yet its value can be seen in that it allows a thorough examination which would help in discovering profitable steps to explain an observed phenomenon. Much of the data would be based on the testimony of a variety of persons directly or indirectly

connected with instruction like teachers, students, parents, administrators, planners, etc. Criteria like expected learning outcomes, political ideology of the broader social system, feasibility aspects like time and cost, etc., should be kept in focus, while dealing with these evidences. Replication of models or strategies with similar purpose in varying instructional situations would help in identifying probable modifications to be carried out in them according to the variation of contexts.

The significance of developmental studies in contributing towards knowledge generation may have to be seen in two ways. First, an investigation into the functioning of an educational intervention in a specific situation helps in generating better understanding regarding the intervention in the context of the organismic as well as environmental variables existing in the situation. Such an understanding leads to generalization about the educational process within the situation under study. Evidently this would require a comprehensive study of all the variables in their natural operation within the given situation. Secondly, apart from generating intra-situational generalization, developmental studies when conducted in educational situations of similar and different nature for comparable objectives provide certain broad generalizations related to the workability of the intervention under study in these situations. Although findings of such studies are not expected to be generalized to a population of situations, an investigator may be in a position to formulate certain broad statements regarding the functioning of an educational intervention under study after it is tried out in various situations of similar and dissimilar nature. And, these statements might help in seeing relationships among innumerable variables that operate in the instructional process. This process will lead to seeing conditions of learning, structuring information and devising effective sequence for presenting this information in an interconnected manner which may finally lead to theorization on instruction.

3.6.3 Understanding Studies

‘Understanding studies’ come under qualitative research. Here ‘understanding’ (or *verstehen*) is accepted as an epistemological principle. Such studies aim at understanding the phenomenon or event under study from the interior. It is the view of one subject or of different subjects, regarding the course of social situations (education included) i.e. conversations, discourse, processes of work, etc., or the cultural or social rules, relevant for a situation, are to be understood. How this understanding is put into methodological terms depends on the theoretical position underpinning the research. In this respect there are three basic positions:

- (i) the tradition of symbolic interactionism, concerned with studying subjective meanings and individual ascriptions of sense;
- (ii) two, ethnomethodology, interested in routines of everyday life and their production;
- (iii) structuralist position, starting from processes of psychological or social unconsciousness. It is possible to differentiate those approaches of understanding studies foregrounding the ‘subjects’ viewpoint’ from those seeking descriptions of given (everyday, institutional, or more generally social) milieus. Understanding studies such as ethnomethodological analyses of language stress strategies interested in how social order is produced, or there may be strategies oriented towards reconstructing ‘deep structures that generate action and meaning’ in a situation. Each of these three positions conceptualizes how the subjects under study – their experiences, actions, and interactions – relate to the context in which they are studied in different ways.

The common features of qualitative research involved in understanding studies across different theoretical positions as noted earlier include ‘*verstehen*’ (understanding), reference to cases studied, construction of reality, and using texts as empirical material. From these features, various questions emerge. How can one understand the process of constructing social reality in the phenomenon under study but also in the process of

studying it? How is reality represented or produced in the case that is (re) constructed for investigative purposes? What is the relation between text and realities?

Texts serve very important purposes in the process of qualitative research. Interviews comprise data which are transformed into transcripts (texts), and interpretations of them are produced afterwards. In observations, field notes are often the database. In many understanding studies, research starts from recording natural conversations and situations to arrive at transcriptions and interpretations. In all such cases of understanding studies, we find text as the result of data collection and as the instrument for interpretation. If qualitative research relies on understanding social realities through the interpretation of texts, two questions become especially relevant: One, what happens in the translation of reality into texts; two, what happens in the retranslation of texts into realities, or inferring from texts to realities. In this process text is substituted for what is studied. As soon as the researcher has collected the data and made a text out of them, this text is used as a substitute for the reality under study in the further process of research.

Text is considered by the researchers in the field of understanding studies as well as the social scientists as the means of making a world of experiences. The world is looked upon as socially constructed through different forms of knowledge

- from everyday knowledge to science and art as different 'ways of world making'. Of late, social scientists have been using 'mimesis' in world making in the texts as a means of transformation of worlds into symbolic worlds; they treat the concept of mimesis as a general principle with which to map out one's understanding of the world and of texts. In applying these considerations to qualitative research and to the texts used within such research, mimetic elements can be identified in the following respects:
- in the transformation of experience into narratives, reports, etc. on the part of the persons studied;
- in the construction of texts on this basis and in the interpretation of such constructions on the part of the researchers;
- finally, when such interpretations are fed back into everyday contexts, for example, in reading the presentations of these findings.

Mimetic processes can be located in social science understanding as the interplay of construction and interpretation of experiences. Mimesis includes the passage from pre-understanding across the text to interpretation. The process is executed in the act of construction and interpretation as well as in the act of understanding, which as an active process of construction involves the one who understands. According to this concept of mimesis, it extends to understanding as a whole and thus also to understanding as a concept of knowledge in the framework of social science research.

A central step in understanding studies is how to formulate the research questions. The researcher is confronted with this problem not only at the beginning, when the study or the project is conceptualized, but in several phases of the process: in conceptualizing the research design, in entering the field, in selecting the cases and in collecting data. The formulation of research questions in concrete terms is guided by the aim of clarifying what the field investigation is expected to reveal. The less clearly a research question is formulated, the greater is the danger that the researcher will ultimately find himself in front of mountains of data helplessly trying to interpret them. Research questions are like a door to the research field under study. Whether empirical activities investigated produce answers or not depends on the formulation of such questions. Also dependent on this is the decision as to which methods are appropriate and who (i.e. which persons, groups or institutions) or what (i.e. what processes, activities, etc.) should be included in the study. The essential criteria for evaluating research questions include not only their soundness and clarity, but also whether they can be answered in the framework of given and limited resources (time, money, etc.)

In the understanding studies one of the most important tools of collecting verbal data is the semi-structured interview which includes focused interview, semi-standardized interview, problem-centred interview, expert interview as well as ethnographic interview. These are various versions of the semi-structured interview and this may be considered as one of the significant methodological bases of qualitative research. It is characteristic of these interviews that more or less open questions are brought to the interview situation in the form of an interview guide. It is hoped that these questions will be answered freely by the interviewee. The advantage of this method is that the consistent use of an interview guide increases the comparability of the data and that their structurization is increased as a result of the questions in the guide. If concrete statements about an issue are the aim of the data collection, a semi-structured interview is the more economic way. If the course of a single case and the context of experiences is the central aim of research, narratives of the development of experiences should be considered as the preferable alternative.

In the understanding studies when the opinions and attitudes about taboo subjects are investigated, the use of dynamics of a group discussing such topics seems to be more appropriate than a clear and well-ordered interview situation. The methods used in such situations are group interviews, group discussions or focus groups. Such group procedures stress different aspects of the task of going beyond interviewing individuals to data collection in groups. Sometimes it is the reduction in time spent interviewing – one group at one time instead of many individuals at different times – which is important. The verbal data gathered through such group processes are more complex than in the single interview. The advantage of this complexity is that data are richer and more diverse in their content than in an individual interview. The problem of this complexity is that it is more difficult to locate the viewpoints of the individuals involved in this common process of meaning-making than in an individual interview.

The role of visual data gathering like observation is central to the methodology of qualitative research. Observation may be non-participant in which case the researcher refrains from interventions in the field. Or, it may be participant observation which is a field strategy that simultaneously combines document analysis, interviewing of respondents and informants, direct participation and observation in the field, and introspection. Ethnography is another method in which observation and participation are interwoven with other procedures; the ethnographer participates, overtly or covertly, in the subjects' daily lives for an extended period of time, watching what happens, listening to what is said, asking questions; in fact collecting whatever data are available to throw light on the issues with which he or she is concerned. These methods and approaches in understanding studies try to accomplish the goal of gaining an insider's knowledge of the field through the researcher's increasing assimilation as a participant in the observed field. Second-hand observation, using photographs, films or videos as instruments of research, has also proved its immense potential in understanding studies. The more sophisticated instruments, both acoustic and audiovisual, have extended possibilities for recording events leading to an essential influence on the developments of qualitative research. The use of recording devices such as tapes and video recorders has been widespread in daily life itself as well. To some extent, their prevalence has made them lose their unfamiliar character for potential interviews or for those people whose everyday life is to be observed and recorded through their use. It is these gadgets which have made possible some forms of analyses like conversation analysis.

Last but not the least; mention must be made of a potentially far-reaching technological change that has begun in the analysis of data, which is linked to the introduction of computers in qualitative research. With help of various software programmes the computer can perform important functions in qualitative research. These are making notes in the field, writing up or transcribing field notes; editing, correcting, extending or revising field notes; coding text to permit later retrieval; storage - keeping text in an organized database; content analysis, data display, graphic mapping - creating diagrams that depict findings or theories; preparing interim and final reports.

Check Your Progress

Notes: a) Space is given below for writing your answers.

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

4. Discuss the nature of relationship studies.

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5. Describe the significance of developmental studies in education.

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3.7 STUDIES IN EDUCATION: COMBINATION OF PERSPECTIVES

In earlier sections we have seen there may be different types of studies in education, namely, Relationship studies, Developmental studies and Understanding studies. These different kinds of studies in education may have different perspectives, approaches and methods. This arises out of the fact that education as a discipline is not unitary in character. The problems of educational research have interfaces with other disciplines and can be solved by fruitfully adopting approaches or methodology of research in those disciplines. This means that the studies in education will not only have different perspectives for different problems under study but also will try to combine or synthesize different perspectives even for a particular study if there is such a need. Which aspect of education is studied more intensively through a particular research would depend upon the view-point of the researcher about education and the approach he adopts to investigate into that. Accordingly, appropriate methodology will be devised and adopted to tackle problems of educational research of a particular orientation. Once this is adequately recognized, a great scope to study educational problems from various points of view with different methodological approaches is opened up. This gives a greater scope of understanding educational problems in a much wider perspective.

In respect of educational research it may be noted that its substance is from the area of education which is much wider in scope than the content area of any other discipline since it aims at dealing with human life in many aspects and its total development. Therefore, inherently it has scope and also the necessity of different approaches and perspectives to research to be brought to bear upon it. These approaches need to be applied appropriately in order to deal with educational problems and understanding them from varied points of view, and levels of understanding. This means that the levels in educational activity have to be perceived in terms of operations at concrete level and gradually reach the levels of abstractions which culminate into its conceptualization adequately. For example, in a teaching-learning situation, a researcher may like to understand a teacher's behaviour and its effectivity. In such a pursuit, he may have the research endeavour to identify the needed professional know-how for teachers, like to see it in terms of various skills or competencies, develop necessary instructional material to provide the teachers sufficient training and orientation which would enable them to use identified skills efficiently and effectively. Up to this stage of the study the researcher may well adopt the positivistic perspective.

But when the researcher attempts to understand as to what goes on in the teacher's mind which guides him to make an instant choice regarding the use of various skills already developed in him, how he reacts to various contingent situations created in the instructional process, what he experiences in the total situation, how he organizes his internal resources to cope with the situation, how he judges learner's difficulties, how adequately equipped he feels when he responds to these actual situations, are some of the many questions that a researcher has to grasp before he can provide adequate explanation of his response to the situation. This seems to be more appropriately done when the researcher looks into the teacher's 'experience' which he alone possesses in all its details and linkages; and this can be extracted and comprehended through a very intimate interaction between the two (the teacher and the researcher) with full empathy developed on the part of the researcher. Calling into service such an approach would amount to being ready to follow the phenomenological perspective for this part of the study. Thus, this is an example which clearly shows an attempt at combining different perspectives under a particular educational study.

3.8 LET US SUM UP

The content of this unit includes the impact of knowledge generation through scientific approach which ultimately opened up different newer fields of study. In reaction to positivistic paradigm, non-positivistic approaches gradually made their presence felt in social sciences and humanities. As a result, the validity of many existing concepts was questioned. By virtue of the wide and composite nature of education, studies in the discipline accepted plurality of perspectives, even attempted to combine different perspectives.

3.9 UNIT-END ACTIVITIES

1. Make adequate library study to prepare a brief note on two each from 'new areas of study', 'new concepts / constructs' and 'new paradigms' in social sciences (education included).
2. Prepare abstracts of doctoral theses in education, one each from the categories of relationship study, developmental study, and understanding study.
3. Interview ten research students in education regarding all aspects of their research study. From the interview reports categorize which researches are included in the three types of studies mentioned under 2.

3.10 POINTS FOR DISCUSSION

Group discussion may be held on the following topics.

1. Can quantitative and qualitative perspectives be combined under a particular research?
2. Is it reasonable to generalize in qualitative research?
3. The days of positivistic approach to research in education are over.

3.11 SUGGESTED READINGS

- Cohen, Louis and Manion, Lawrence (1994): *Research Methods in Education*. Fourth edition, New York: Routledge.
- Van Dalen, Deobold B. (1979): *Understanding Educational Research: An Introduction*. Fourth edition, New York: McGraw Hill Book Company.
- Flick, Uwe (1996): *An Introduction to Qualitative Research*. London: Sage Publications.

- Ghosh, B. N. (1999): *Scientific Method and Social Research*. Revised edition, New Delhi: Sterling Publishers Private Limited.
- Keeves, John. P. (ed.), (1990): *Educational Research, Methodology, and Measurement: An International Handbook*. New York :Pergamon Press.
- Yadav, M. S. and Mitra, Shib K. (1989): *Educational Research: Methodological Perspectives*. Baroda : CASE, M.S. University.

3.12 ANSWERS TO CHECK YOUR PROGRESS

1. Positivistic paradigm of knowledge generation is based on the philosophical ideas of the French Philosopher, Auguste Comte, who considered observation and reason as the means of understanding human behaviour. In this approach all genuine knowledge is based on sense experience and can be only advanced by means of observation and experiment. It has been described as a 'tough – minded orientation to facts and natural phenomena'.
2. The following are the limitations of Positivistic Paradigm:
 - (i) The theoretical perspective which has dominated the positivistic paradigm seeks the facts or causes of social phenomena with little regard for the subjective states of individuals.
 - (ii) In positivistic paradigm social facts or social phenomena are considered to be the things that exercise an external and coercive influence on human behaviour.
 - (iii) The positivist searches for facts and causes through methods such as survey, questionnaire, etc which produce quantitative data. It allows him to statistically prove relationships between operationally defined variables, thus reducing human behaviour to statistical aggregates.
 - (iv) Positivistic paradigm presents a misleading picture of the human being because it concentrates on the repetitive, predictable and invariants of the person (i.e. on his visible externalities) to the exclusion of the subjective world. It ignores the world in which the meanings are developed by active subjects through their life experiences.
 - (v) The positivist puts more effort in scientific experimentation which are likely to end up with a pruned, synthetic and constructed version of the whole social reality.
3. The three field methods are:
 - (i) Case study method.
 - (ii) Projective techniques
 - (iii) Anecdotal records
4. The relationship studies gather facts to obtain an accurate description of existing phenomena and then attempt to trace the relationship between facts which provide deeper insight into the phenomena.
5. Developmental studies are useful in investigating the characteristics of children and the ways in which these characteristics change with growth and development. Such studies are concerned not only with the present status and interrelationships of phenomena but also with changes that take place as a function of time. The educators, teachers and counselors gather reliable information about the intellectual, physiological, and emotional growth of children at various ages, how they differ from one another within certain age levels; such information is useful in taking decisions about the type of curriculum, textbooks and teaching methods.

UNIT 4 APPROACHES TO EDUCATIONAL RESEARCH: ASSUMPTIONS, SCOPE AND LIMITATIONS

Structure

- 4.1 Introduction
- 4.2 Objectives
- 4.3 Nature of Educational Phenomena
- 4.4 Conceptions of Viewing Reality
 - 4.4.1 The Objective and Subjective Views of Reality
 - 4.4.2 The Nature of Reality
 - 4.4.3 The Nature of Knowledge and Knowing
 - 4.4.4 The Nature of Human Agency
 - 4.4.5 Methodology
- 4.5 Limitations of the Approaches
- 4.6 Let Us Sum Up
- 4.7 Unit- end Activities
- 4.8 Points for Discussion
- 4.9 Suggested Readings
- 4.10 Answers to Check Your Progress

4.1 INTRODUCTION

Men and women have long been concerned with coming to grips with their environment and to understand the nature of the phenomena it presents to their senses. The approaches by which they set out to achieve these ends may be classified into two broad categories: Quantitative and Qualitative. Far from being independent and mutually exclusive, these categories must in fact be seen as complementary and overlapping whenever solutions to complex modern problems are sought.

There was a time when most researchers believed that the only phenomena that counted in social sciences were those that could be measured. To make that perfectly clear, they called any phenomenon they intended to study a 'variable', indicating that the phenomenon could vary in size, length, amount, or any other quantity. Unfortunately, not many phenomena in the human world come naturally in quantities. How many people tune in to a certain television show, how long they watch it, and what their average is, for instance, are variables of interest to a person curious about human affairs, but such observable behaviours and statistics merely scratch the surface.

Why did people choose this show? What do they get out of it? What does it make them feel like? Why do people watch television in the first place? To understand more about human phenomena of this kind, first, we have to create concepts or psychological constructs and second, invent a way of measuring them. Developing measuring instruments and comparing groups of people on how they scored on these instruments, consumed a major portion of the social scientist's time. Even things as tenuous as opinions and attitudes were converted into numbers, which in turn were plugged in to statistical formulae that yielded other numbers. Of course, even hard headed quantitative researchers concede that a person scoring 3 probably does not like the matter in question

precisely three times as a person scoring 1. Nor would any one claim that a confidence level of .05 is definitely more acceptable than one of .06 when considering whether the size of differences between score results obtained from comparable groups could have occurred by chance or not. Yet at least the procedure is objective and, besides, it is the only accepted method for testing hypotheses about the way the social world functions.

Then again, Sigmund Freud discovered plenty about the way human beings function, and so did Jean Piaget. Neither of them tested hypotheses, or used large and representative enough samples of people to satisfy the rules of statistics. Yet they both made important assertions about human beings and created many psychological constructs for use in the description of their theories. Both Freud and Piaget were master observers. They tried to make sense of what they saw, or, as you could also say, they tried to find out what it means (Wertz, 1987).

Which of these two ways of doing research is the best, measuring and testing, or observing / listening and interpreting / constructing? That depends on what you believe. Moreover, the process of research is a process of persuasion. You must believe what you find most convincing.

In this unit, you will get to know the nature of phenomena, how a single phenomenon can be viewed and interpreted from two major approaches – quantitative and qualitative. In this context, both objective and subjective conceptions of reality will also be discussed.

4.2 OBJECTIVES

After having studied this unit, you will be able to:

- differentiate between Quantitative and Qualitative research.
- discuss the nature of education as a broad canvas to accommodate both these approaches,
- explain the multidimensional aspect of reality,
- enumerate the assumptions underlying the different approaches,
- discuss the limitations of the approaches, and
- examine the required / desired methodology for a particular piece of research.

4.3 NATURE OF EDUCATIONAL PHENOMENA

Education is a process, a design for causing anticipated learning in individuals. This learning represents changes in individuals, which are basically intrinsic but get manifested into action forms in different situations in an individual's life. There would also be a qualitative improvement in the life of collectivities. Schools and colleges have become the widely recognized educational institutions ensuring that individuals 'experience' education: and schooling is a term connoting institutionalized learning. In other words, education directly focus the quality of life of individuals in society under given conditions. Educational practice pertains to deriving substance from the overall body of disciplinary knowledge, formulating them into transactable curricular forms, making choices of curricular components and also deciding the modes of transacting them. Such actions for selectivity make education an action-oriented, practice based programme or activity. In such an endeavour, while articulating on education, the researcher adopts several concepts borrowing from cognate disciplines. This is not to say that concepts in the discipline of education are not there. In fact, if one looks for concepts in education, one does find them in plenty, such as, curriculum, syllabus, work experience, drop-out, instruction, etc. However there are many other concepts

which are used in education such as learning, motivation, habits, intelligence, instructional system, cultural heritage, national integration, social justice, etc. It is often said that these are concepts from other disciplines, 'borrowed' into education (Yadav and Laxmi, 1995). Thus, the broad canvas of education encompasses a multitude of concepts from different disciplines. Since each concept emerges from a particular disciplinarian perspective, their connotation changes when used in other disciplines. For example, 'effectiveness' is a concept used in natural science but used differently in education and psychology. Therefore, while trying to understand education, one has to have an interdisciplinary attitude. It is only then possible for us to have a holistic perspective about any educational phenomenon.

The idea about the nature of education, presented thus far, clearly indicates the scope for viewing educational phenomena differently from different perspectives. Let us now discuss these perspectives.

Check Your Progress

Notes: a) Space is given below for writing your answer.

b) Compare your answer with that given at the end of the unit..

1. Why is it necessary to have interdisciplinary attitude in order to understand education properly?

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4.4 CONCEPTIONS OF VIEWING REALITY

A characteristic feature of education in India and elsewhere has been its uneven progress. Perhaps a major reason for the slow and unsure progress in education has been the inefficient methods used by educators in acquiring knowledge and solving their problems (Borg, 1963). This rather gloomy but none-the-less accurate assessment of the position maintained generally for many years and which still characterizes some areas of education has now, fortunately, been tempered by the knowledge that in the past few years modest advances have been made as a result of the application of the methods of social science to the study of education and its problems. Interestingly, this development has itself resulted in a controversy and debate for, in adopting a social scientific orientation, educational research has at the same time absorbed two competing views of social sciences – the established, traditional view and a more recently emerging radical view. The former holds that the social sciences are essentially the same as the natural sciences and are therefore concerned with discovering natural and universal laws regulating and determining individual and social behaviour; the latter view, however, while sharing the rigour of the natural sciences and the same concern of traditional social science to describe and explain human behaviour, emphasizes how people differ from inanimate natural phenomena and, indeed, from each other (Cohen and Manion, 1994). These contending views – and also their corresponding reflections in educational research – stem in the first instance from different conceptions of social reality and of individual and social behaviour. Let us examine these in a little more detail.

The two views of social science mentioned above represent strikingly different ways of looking at social reality and are constructed on correspondingly different ways of interpreting it. Burrell and Morgan (1979) have developed a typology of paradigms in sociology that has proven useful in provoking thought and reflection about some deep

assumptions that undergird approaches to research. Their work is presented in the next section as a guide to help you think about where you stand on some basic questions and to begin to situate yourself along two continua of assumptions; one about research and the other about the social world.

Check Your Progress

Notes: a) Space is given below for writing your answers.

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

2. State the traditional view of social science held by educational researchers.

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3. State the radical view of social science held by educational researchers.

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4.4.1 The Objective and Subjective Views of Reality

Let us suppose that as an organizer of a training programme you are seeking some information from your participants. While the participants are responding, you ask a rhetorical question to know if the participants are telling the truth. Although you may not fully realize it, you are asking a fundamental question about assumptions you are making, about the construction of knowledge, and about what that knowledge is – what is “the truth” and how do we know it? Assumptions that relate to these questions are captured by the subjectivity and objectivity continuum. Think about what you believe is ‘truth’, How do you know something is true? How do you trust what someone says to you? When you ask a friend or colleague, “how do you know that?”, what do you take as evidence that convinces you? What is the relationship between the knower and the known, or the learner and what he or she learns? What do you believe about the nature of reality? How do people act in that reality? What do these beliefs imply for doing research – your methodology? The continuum appears as follows:

Subjectivity $\longleftrightarrow$ Objectivity

Where our researchers position themselves depends on answers to important sets of questions. Table 4.1 presents the polar extremes of the continuum.

Table 4.1: A scheme for analyzing assumptions about the nature of social science.

Subjectivist Assumptions	Bases	Objectivist Assumptions
Nominalism	→ ONTOLOGY	Realism
Anti-Positivism	→ EPISTEMOLOGY	Positivism
Voluntarism	→ HUMAN NATURE	Determinism
Ideographic	→ METHODOLOGY	Nomothetic

Source: Burrell and Morgan, 1979.

4.4.2 The Nature of Reality

As mentioned earlier, Burrell and Morgan (1979) have identified four sets of assumptions, and the same have been presented in Table 4.1. The first set of assumptions are of an ontological kind- assumptions, which concern the very nature or essence of the social phenomena being investigated. This facet of the subjective-objective dimension explores beliefs about reality – which is no small task. This question is important because social science, whatever its methodologic guise, seeks to learn about social phenomena – reality, as people understand it. To locate on this continuum, ask the following questions: Do I believe that reality is of an objective nature? Is it “out there”, independent of human perception, and therefore something that I can learn about without direct experience? Does it exist independently of my perception? In contrast, do I believe that reality is the product of my individual experience and understanding? Is reality constructed through my subjective experience and intersubjective understanding?

Objectivist assumptions hold that reality exists independent of human cognition and that the work of social science is to discover important facts and processes that constitute the reality. The processes are out there, waiting to be uncovered. Subjectivist assumptions, however, argue that humans construct understanding of reality through their perceptual and interpretive faculties. Social processes are created by human interpretation; they do not constitute reality per se but are concepts that describe it.

The questions presented above on the continuum of subjective and objective dimensions spring directly from what is known in philosophy as the nominalist-realist debate. The former view holds that objects of thought are merely words and that there is no independently accessible thing constituting the meaning of a word. The realist position, however, contends that objects have an independent existence and are not dependent for it on the knower.

Check Your Progress

Notes: a) Space is given below for writing your answer.

b) Compare your answer with that given at the end of the unit.

4. In one of the classes on research methodology, students were discussing where the ‘conflict theory’ would fit along the subjective and objective continuum. One group of students asserted that conflict as a principle of social organisation, exists. Almost in one voice, the other (second) group of students dissented, countering that conflict theory is a social construct that helps us better in understanding reality. They argued that conflict did not exist “out there”, waiting for others to discover it.

On the basis of the above situation answer the following questions.

- a) Which group of students hold objective assumptions about reality?
- b) Which group of students hold subjective assumptions about reality?

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4.4.3 The Nature of Knowledge and Knowing

The second set of assumptions are of an epistemological kind. These concern the very bases of knowledge-its nature and forms, how it can be acquired, and communicated to other human beings. Subjectivists hold that the very notion of “truth”

is problematic. They argue that, except for certain principles about the physical world, there are few truths that constitute universal knowledge; rather, there are multiple perspectives about the world. An objectivist, by contrast, asserts that there is truth about a particular circumstance that can be determined. Your question, then follows: In doing research, will you search for Truth – with a capital T – or Truths – multiple perspectives?

Questions you can ask yourself include the following: How do I learn about something? What do I take as evidence to support a point? Do I accept what I read and hear, or do I examine it critically, based on my own experience? From an objectivist position, one may argue that knowledge is tangible and “hard”. With more subjectivist belief, another person may argue that knowledge comes in multiple forms, many quite personal, including dreams, and spiritual and transcendental. Another question invites you to think about where you believe knowledge can appropriately be produced and who can legitimately engage in that creation. Subjectivist views hold that knowledge about the social world arises from many quarters; important understandings are evident in novels, the arts, the media and in formal social science reports and articles. A poem or drawing is as legitimate a portrait of life experience as a research report. An objectivist would see such knowledge as soft, unscientific, and idiosyncratic: How one aligns oneself in this particular debate profoundly affects how one will go about uncovering knowledge of social behaviour. The view that knowledge is hard, objective and tangible will demand of researchers an observer’s role, together with an allegiance to the methods of natural science to see knowledge as personal, subjective and unique, however, imposes on researchers an involvement with their subjects and rejection of the ways of the natural scientist. To subscribe to the former is to be positivist; to the latter anti-positivist.

Check Your Progress

Notes: a) Space is given below for writing your answer.

b) Compare your answer with that given at the end of the unit.

5. Professor ‘X’ has just finished his class on qualitative research. Students have left the class without adequate understanding of the principles and steps of doing qualitative research. Since it is compulsory for them to conduct a research work following qualitative methodology, they are engaged in discussing the subject. Their discussion is centered on the class experience and what professor ‘X’ did or did not say and mean or did not mean. On the basis of the following, answer the following questions.

a) From an objectivist point of view, what would be your stance?

b) From subjectivist point of view, what would be your stance?

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4.4.4 The Nature of Human Agency

This facet of the subjective – objective dimension focuses on assumptions about our relationship to the world we live in. You might ask yourself the following: Do I assume that people respond mechanically, in an independent manner? Are we conditioned by external circumstances such as social forces? Are we more creative, exercising free will in shaping our environment and everyday lives? Objectivists assume that human actions are predictable and, hence, controllable; subjectivists, however, hold that human

agency is crucial for shaping everyday lives. They maintain that unpredictability is the hallmark of human action; the goal is to describe and interpret how people make sense of and act in their worlds. In these two extreme views of the relationship between human beings and their environment, we are identifying a great philosophical debate between the advocates of 'determinism' on the one hand and 'voluntarism' on the other.

Check Your Progress

Notes: a) Space is given below for writing your answer.

b) Compare your answer with that given at the end of the unit.

6. Jean (12 yrs) & Jim (30 yrs) are on an expedition in the dense jungles of Africa. Both of them hope to shoot exclusive wildlife photographs. Suddenly, Jim slips and falls into a marsh and is attacked by a ferocious alligator.

Now consider Jean's possible response

- a) Conditioned by fear and knowing that the alligator possesses exceptional ferocity and strength, Jean should refrain from helping Jim.
- b) Despite knowing this, Jean should jump in and try to match her cunningness with the crocodile's physical strength.
- c) Knowing that she cannot do much, she must run to their vehicle and contact someone for help.

Which of these is the most objective approach ?

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4.4.5 Methodology

The assumptions made in the previous three categories have implications for the methods you choose to conduct your work of inquiry. Different assumptions incline you toward different methods. Investigators adopting an objectivist (or positivist) approach to the social world and who treat it like the world of natural phenomena as being hard, real and external to the individual, will choose from a range of traditional options – surveys, experiments, and the like. Others favouring the more subjectivist (or anti-positivist) approach and who view the social world as being of a much softer, personal and humanly created kind, will select from a comparable range of recent and emerging techniques – accounts, participant observation and personal constructs, for example.

When one subscribes to the view which treats the social world like the natural world – as if it were a hard, external and objective reality – then, scientific investigation will be directed at analyzing the relationships and regularities between selected factors in that world. It will be predominantly quantitative. This perspective expresses itself more forcefully in search of universal laws which explain and govern the reality which is being observed. An approach characterized by procedures and methods designed to discover general laws may be referred to as 'nomothetic'. However, if one favours the alternative view of social reality which stresses the importance of the subjective experience of individuals in the creation of the social world, then the search for understanding focuses upon different issues and approaches them in different ways. The principal concern is with an understanding of the way in which the individual creates, modifies and interprets the world in which he or she finds himself or herself. The approach now takes on a qualitative as well as quantitative aspect. As Burrell

and Morgan observe, the emphasis in extreme cases tends to be placed upon the explanation and understanding of what is unique and particular to the 'individual rather than of what is general and universal. This approach questions whether there exists an external reality worthy of study. In methodological terms it is an approach which emphasizes the relativistic nature of the social world (Burrell and Morgan, 1979). In its emphasis on the particular individual this approach to understanding individual behaviour may be termed as 'idiographic'.

In this review of Burrell and Morgan's analysis of the ontological, epistemological, human and methodological assumptions underlying two ways of conceiving social reality, the foundations have been laid down for a more extended study of the two contrasting perspectives evident in the practices of researchers investigating human behaviour and by adoption, educational problems.

Each of the two perspectives on the study of human behaviour outlined above has profound implications for research in classrooms and schools. The choice of problem, the formulation of questions to be answered, the characterization of pupils and teachers, methodological concerns, the kinds of data sought and their mode of treatment – all will be influenced or determined by the viewpoint held.

Check Your Progress

Notes: a) Space is given below for writing your answer.

b) Compare your answer with that given at the end of the unit.

7. The national predicament of universalisation of elementary education could not be realised in India because.

- a) We focussed more on quantitative research wherein the generalisations cut across the commonalities.
- b) There was lack of micro planning and research at grass root level.

Which one of the above adopts the idiographic approach ?

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4.5 LIMITATIONS OF THE APPROACHES

The elaborate discussion of the assumptions of subjective and objective views of reality has set the stage for a reader / researcher to follow either qualitative or / and quantitative approach based on his belief system. However, before embarking on any study one should know the limitations of these approaches so that meaningful understanding of the researched phenomena can be arrived at. Furthermore, the limitations should be read vis-à-vis the approaches.

One of the major limitations of objectivist (Quantitative) approach is its mechanistic and reductionist view of nature which, by definition, excludes notions of choice, freedom, individuality, and moral responsibility. Every individual holds a meaning of his existence which he views as 'concrete' and so his behaviour is unique and irreducible, not amenable to quantitative conceptualization. Another limitation is the quantification of human behaviour and experience which results in the depersonalization of self. The limitation is not directed at quantification per se, but at quantification when it becomes an end in itself. No matter how exact measurement may be, it can never give us an experience of life, for life cannot be weighed and measured on a physical scale.

In line with quantitative approach, the subjectivist (quantitative) approach also suffers from some limitation. First, the researcher's complete reliance on the actors' definitions of the situations. It is quite probable that some of the actors might be falsely conscious of the societal situations. Second, the unscientific means adopted to construct / gain knowledge. Knowledge gained through human agency is always partial. Third, this approach does not allow any scope for verification of result. Fourth, there is an overriding concern for meaning construction which presupposes a structure of meanings and relationships between situations. Fifth, this process whereby one interprets and defines a situation is itself a product of the circumstances in which one is placed. Consequently, values and ideas of the researcher penetrate into the research process.

Limitations of approaches place some boundaries around and set some conditions. These are the reservation and qualifications inherent in any research. Limitations are derived from the design and methods used in any approach and help to contextualize the study. They stipulate the weaknesses of approaches; thereby encouraging the reader to judge it with these limitations in mind. Nevertheless, while going through the limitations, the reader should remember that no study following any approach(es) is/are perfect; that findings are tentative and conditional, that knowledge is elusive and approximate, and our claims should be humble, given the extraordinary complexity of the social world we want to learn more about.

Check Your Progress

- Notes:** a) Space is given below for writing your answer.
b) Compare your answer with that given at the end of the unit.
8. Given below are a few statements. Read them carefully and state whether they are true or false. If false, write the correct statement.
- a) Quantitative and qualitative approaches to educational research can be seen as complementary and overlapping to each other.
 - b) The nature of a problem and the belief held by an individual, together decide the best way of doing research.
 - c) Understanding educational phenomena requires a disciplinarian attitude on the part of the researcher.
 - d) The ontological assumptions of social reality are concerned with the very nature or essence of the social phenomena being investigated.
 - e) The subjectivist approach to social science describes human nature as deterministic.
 - f) An approach characterized by procedures and methods to discover general laws may be referred to as Idiographic.
 - g) Limitations of approaches are the reservations and qualifications inherent in any research.
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4.6 LET US SUM UP

In the beginning of the unit, we held the view that doing research, quantitative or qualitative, depends upon the belief we hold. Accordingly, the research process is directed at the realization of those beliefs. The belief system held by a person stems,

by and large, from the disciplinarian orientation. Education is such a discipline (in the social science field), the nature of which provides an arena for a wide variety of belief systems to be held by different individuals. This provides a scope for viewing reality differently, which can be broadly classified under subjective and objective dimensions. Each of these dimensions has certain underlying assumptions, which guide the research process. The choice of a research problem, the formulation of questions to be answered, the characterization of pupils and teachers, methodological concerns, the kinds of data sought and their mode of treatment, all will be influenced or determined by the viewpoint held. Furthermore, the discussion on the limitations of these approaches will remind the reader that no studies following any one approach is perfect, that findings are tentative and conditional, that knowledge is elusive and approximate, and that our claims should be humble, given the extraordinary complexity of the social world we want to learn more about.

4.7 UNIT-END ACTIVITIES

- Given below are a few situations. Read them carefully and respond to the questions presented below.

Situation – I

A man was driving in a remote area and saw a sizable herd of sheep being driven along the road by a shepherd. Seeing that he would be delayed until the sheep would be turned off the road, he got out of the car and struck up a conversation with the shepherd.

“How many sheep do you have?” he asked.

“I don’t know,” responded the shepherd. Surprised at this answer, the traveller asked: “How do you keep track of the flock if you do not know how many sheep there are? How would you know if one was missing?”

The shepherd seemed puzzled by the question. Then he explained, “I do not need to count them. I know each one. I know the whole flock and I would know if the flock was not whole.”

Question :

With regard to the nature of knowledge and knowing, who holds the subjectivist view and who holds the objectivist view?

Situation – II

In a school, a teacher was explaining the many differing perspectives one could use in looking at the environment. While he answered questions and continued the discussion, he sent a student to inquire if the midday meal was ready.

The student did not return, so the teacher sent a second student. The second student did not return. So he went himself. He found the two students, the cook, and three researchers engaged in a heated debate. Ignoring the debate, the teacher asked “Is the midday meal ready?” The first scholar responded, “I have been explaining to these people that the state of food is not the only issue in determining readiness. A meal is not just food. The meal must include those who would partake food, so the meal is not ready until everything is in order and those who would eat are assembled”.

The second scholar said, “I dared to taste the meal. From the perspective of an experienced chef, this meal will never be ready. It is hopeless, let us return to the village.”

The third scholar said, "Readiness is a state of mind, not a physical state. Since the food has no mind, the food cannot be ready. Only people can be ready".

The chef added, "The midday meal is at midday everyday. At midday, the meal is ready. Why ask if the meal is ready ? It is midday. This is the meal. Therefore the midday meal is ready."

Question :

- a) Identify the base or level of discussion.
- b) Which of the two things are they discussing ?
 - i) The Nature of knowledge and knowing
 - ii) The nature of reality.
- c) Identify the assumptions held by the three scholars and the chef.

Situation – III

It is 10.00 a.m, you are on your way to the department. While going, you suddenly come across an accident wherein a person is severely injured. What will you do ?

Alternatives

1. You will be indifferent
2. You will intimate the police
3. You will intimate the family members of the injured person.
4. You will immediately take the person to the hospital.

Which one of the alternatives is the most voluntary humanistic response ?

Which one of the alternatives is the most mechanistic response ?

Situation – IV

Given below are two research problems.

1. A study of the Ethnic Factors Affecting Education of Scheduled Tribes of Dang District of Gujarat.
2. A study of the Correlates of Academic Achievement of Students of Std. VIII in Science.

Categorize the above two studies as ideographic or nomothetic.

4.8 POINTS FOR DISCUSSION

1. Discuss in detail how the nature of education provides scope for viewing social reality differently.
2. The understanding of educational research would be incomplete without knowing the underlying assumptions of quantitative and qualitative approach.

4.9 SUGGESTED READINGS

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4.10 ANSWERS TO CHECK YOUR PROGRESS

1. Academic pursuits in the field of social science are often described as interdisciplinary in nature. Moreover, the field of education draws concepts and substance heavily from the cognate disciplines. Therefore, it is necessary to have an interdisciplinary attitude to understand the field of education properly.
2. Social sciences are essentially the same as the natural sciences and are therefore concerned with discovering natural and universal laws regulating and determining individual and social behaviour.

Sharing the rigour of the natural sciences and the same concern of traditional social sciences to describe and explain human behaviour, the above emphasizes how people differ from inanimate natural phenomena and, indeed from each other.

3.
 - a) The first group
 - b) The second group
4.
 - a) To analyse the actual words spoken by Professor ‘X’ and what went on in the class room - fact based.
 - b) To arrive at an understanding about the situation formed through personal experience, interaction & discussion.
5.
 - a) The second response is the most objective one.
6.
 - a) Answer B adopts the idiographic approach.
7.
 - a) True
 - b) True
 - c) False – Understanding educational phenomena requires an interdisciplinary attitude on the part of the researcher.
 - d) True
 - e) False – The subjectivist approach to social science describes human nature as voluntary.
 - f) False – An approach characterized by procedures and methods to discover general laws may be referred to as nomothetic.
 - g) True

NOTES

