

CHAPTER I
INTRODUCTION

I.1 INTRODUCTION

In any country, education is of paramount importance for realisation of its national goals. It is education through which physical as well as human resources can be developed and geared to attain the set objectives. It is more so in a developing country like ours where not only these resources are to be developed at faster rate, but the necessary social climate suited to fast changing ways of life is also to be generated, which amounts to attitudinal changes in its people in various sections. Recently there has been a greater emphasis on relating the process of education with the development of the society. By development is meant evolution of the society towards particular goals. These goals represent the changes to be brought about in various aspects of individual and social life. However, the goals set for any society will not be of an absolute nature. These would be determined by the stage of evolution, the society has reached and the potential it has for further development. Thus, the process of formulating goals, and concretising attempts to realise them will be a continuous one. The process of concretising these attempts will mean introducing certain inputs

in specially designed ways, to initiate the development at individual level, and thereby effect a larger social change. Education Commission (1964-66) has highlighted the importance of education in its first statement. 'The destiny of India is now being shaped in her classroom.' Therefore, any one concerned with education should take care of its qualitative and quantitative improvement. Any improvement in education should essentially reflect changes in the process of teaching. It is because, the bulk of institutionalised education is carried out in the form of classroom teaching.

Teaching is a complex process which involves many skills and attitudes expressed through the behaviour of the teachers. The classroom behaviour of teachers results into changing the behaviour of learners in the classroom, which is the psychological atmosphere in which students interact with teachers or materials; they may interact among themselves too. It is through this process that they learn. Learning therefore, depends on interaction. Teachers' role, thus, would be to make the classroom climate conducive to productive interaction. The product of this process would be learning. In the teaching-learning process, learning is central and all the teaching efforts are aimed at maximisation of learning. The main role of the teacher is to promote learning. For this purpose a teacher has to organize instructional activities in such a manner that pre-specified instructional goals can be realized. Efforts have been made in this direction to identify and organize the instructional

activities to achieve certain educational objectives (Sharma 1972, Shaيدا 1975, Padma 1976, Roy 1976, Roka 1976, Pillay 1978, and Chakraborty 1978). Although, efforts have been made in this direction, the attributes that contribute to effective teaching are not yet identified with any certainty. The ingredients which, when put together, make a good teacher are still not identified. It may be due to the fact that the phenomenon of teaching is very complex and has not been studied in depth. It necessitates a thorough understanding of teaching which is discussed in the subsequent paragraphs.

I.2 TEACHING

Teaching has been defined in various ways by different authors. Teaching, understood in its broadest sense, as a social interaction with the purpose of imparting knowledge or providing information, is as old as the human civilization. Thorndike (1913) defined teaching as the arrangement of situations which leads to desirable bends and make them satisfying, which in simple terminology means, sequencing different activities to achieve a particular goal. According to Morrison (1934), teaching is intimate contact between a more mature personality and a less mature one designed to further the education of the latter. For Gage (1963), teaching is an interpersonal influence aimed at changing the ways in which other persons can or will behave. Skinner (1968) defines teaching as, 'the arrangement of contingencies of reinforcement

under which students learn'. Mitra (1972) suggests that teaching be viewed within ^{the} a framework of classroom and defines it as, 'a series of acts carried out by a teacher and guided by the formulation of teaching task in a formalised instructional situation'.

The definitions by some of the prominent thinkers given above reveal that teaching has been considered both in its wider as well as in its narrower sense. In fact, aims, processes and evaluation of education are primarily associated with teaching and reasonably, therefore, the vital problems in education cannot be solved unless one looks into the problems and process of teaching. From process points of view teaching has several aspects. In order to understand the problems of teaching these aspects have to be kept in mind. The major aspects of teaching which have been identified are :

(i) motivating the students by accepting their feelings, praising them and accepting their ideas, (ii) questioning, (iii) lecturing, (iv) guiding the students, responding and the like. Questioning is one of the important aspects of teaching.

If one tries to understand and improve teaching-learning process, he must think of an approach through which learning can be maximised. Although, it is difficult to decide about an approach which may be good for better learning, but, it may be possible to state that any approach where pupils'

involvement is meaningfully greater may lead to better learning. Questioning is one of the most important aspects of teaching which may lead to greater involvement of students in teaching-learning process. Therefore, improving the questioning behaviour of a teacher, learning can be maximised. In order to plan a study on questioning, it is essential to perceive clearly what is meant by questions, how they are classified and how each type of question enables the teacher to develop certain specific abilities in the children. This is attempted subsequently.

I.3 QUESTIONS

The Random House Dictionary of the English language defines question as, 'a sentence in an interrogative form, addressed to someone in order to get information in reply.' Webster's New World Dictionary describes question as, '(i) asking, inquiry; (ii) something that is asked; (iii) interrogative sentence, as in seeking to learn or in testing another's knowledge, query, etc.' A question is a verbal utterance that seeks a 'response' from the person to whom it is directed. It is a means of finding out and interpreting information. In fact, it is more than a logical grouping of words punctuated by question mark. Traditionally, questions have been used to determine what has been learnt too often as isolated bits of knowledge which are of little value. But, its most important offering is its value for stimulating and directing thinking. As Bossing (1942) points out, 'it is an effective stimulus and it is readily

available to teachers'. A well developed understanding of the characteristics and potentials of the question, as well as skill in using it effectively, becomes one of the most valuable devices with which the teacher can assume his responsibilities as a manager of learning (Cunningham, 1971). But, in the classroom situation, it may not be always a question punctuated with question mark. There could be certain problems which require solutions from the students or it could be a simple statement that may stimulate students to react or respond. Keeping in mind this point of view the question is defined for the present study as follows :

'A question is a verbal utterance of logically sequenced words which seeks response, solution or reaction from the person to whom it is directed.'

Having defined the question, it is necessary to explain different kinds of questions as they have been classified by different authors.

I.3.1 Classification of Questions

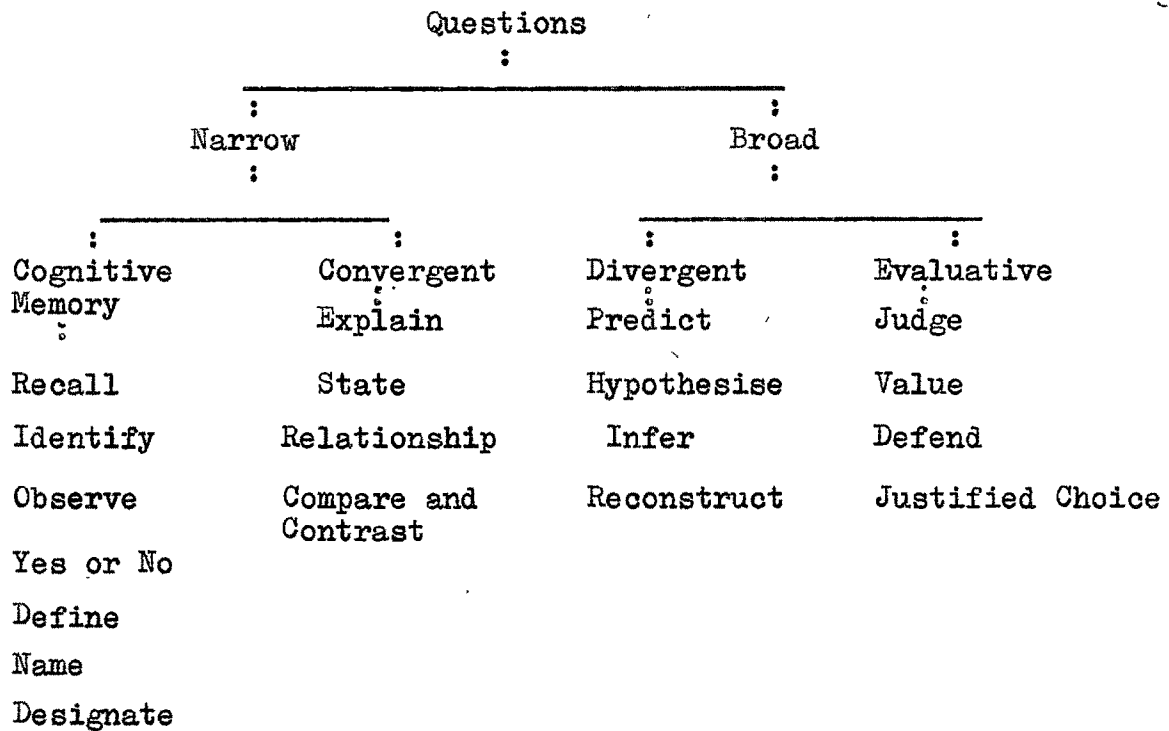
The classification of questions is usually based on the nature of the response which it may require from the respondents and the ability which is needed to respond to the question. A number of classifications developed by different educationists are available.

One of these classifications is based on the taxonomy of educational objectives by Bloom (1956) where educational objectives have been classified into six categories, viz.,

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knowledge, comprehension, application, analysis, synthesis and evaluation. Sanders (1966) made use of Bloom's taxonomy and classified questions into seven categories which are memory, translation, interpretation, application, analysis, synthesis and evaluation. The word 'taxonomy' refers to a special system of classification in which the classes are sequential and cumulative rather than arbitrary.

Another system of classifying teachers' questions was developed by Smith and Meux (1970). Using essentially a logical analysis of the kind of responses which teacher questions required they developed thirteen categories of discussion initiating verbal moves. These include : (i) defining, (ii) describing, (iii) designating, (iv) statement, (v) reporting, (vi) substituting, (vii) evaluating, (viii) opining, (ix) classifying, (x) comparing and contrasting, (xi) conditional inferring, (xii) explaining, and (xiii) classroom management. Flanders (1970) has divided questions into two categories in his new category system. They are : (i) narrow and (ii) broad. Narrow questions category refers to factual questions, emphasizing recall : what, where, and when. Broad questions category refers to open questions which clearly permit choice in ways of answering. Like Flanders (1970), Cuningham (1971) also classifies questions into two main categories - narrow and broad. Further, he subdivides these categories and gives them specific symbols. His classification can be seen at a glance in the following presentation:



From the above presentation, it can be seen that first of all, questions are classified into two main categories, that is narrow and broad questions. Narrow questions are further divided into cognitive memory questions and convergent questions whereas broad questions are divided into divergent questions and evaluative questions. Then, there are further subdivisions of these four categories. Cognitive memory questions are split into - recall, identify, observe, yes or no, define, name and designate; convergent are split into - explain, state, relationship, and compare and contrast; divergent are split into - predict, hypothesise, infer and reconstruct; and evaluative into - judge, value, defend and justified choice.

For the purpose of the present study the classification suggested by Sanders (1965), has been taken into consideration. In this classification, the questions are divided into seven categories, viz., memory, translation, interpretation, application, analysis, syntheses and evaluation. This classification was selected because it is relevant to the classroom teaching as the classification is based on educational objectives. In this classification the taxonomy of educational objectives is carried out in a new direction by the 'Taxonomy of Questions.

In the present study, a modified version of Sanders' taxonomy is used. In the modified version teachers' questions are assigned to one of the six categories, viz., memory, translation, interpretation, application, higher level and routine types of questions. At this stage, it is appropriate to define different categories of questions used for this purpose.

(i) Memory Questions : Memory type question requires the student to recognize or recall information which has already been given to him. The student is not asked to compare or relate or make any inductive or deductive leap on his own. In this category, a teacher is trying to test the knowledge of the students regarding some facts, definitions, generalizations and values, etc. Here, in fact, stress is on the knowledge which comes from direct observation. Definition is the designated

meaning of words. Generalization is a statement that declares the common characteristics of a group of ideas or things and widely accepted generalizations are known as principles or laws; but most are not graced with such a title. A value differs from a generalization in that it expresses a judgment of quality. It states that something is good or bad; fair or unfair, beautiful or ugly, right or wrong, useful or useless, important or trivial, true or false, etc.

Below are given a few examples of this type of questions :

1. Which European was the first to come to India ?
2. Where did the British establish their first settlements in India ?
3. When do we celebrate the Republic Day ?
4. Name the main parts of human nervous system.
5. What is the function of Eustachian tube ?

(ii) Translation Questions : The thinking involved in translation questions is quite literal and does not require students to discover intricate relationships, implications, or subtle meanings. The student identifies one part of the original communication at a time and translates it into the new form.

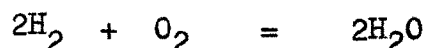
An idea can be expressed in several different forms of communication, such as oral, written, pictorial or graphic. Some examples are pictures, graphs, charts, maps, models, socio-dramas, poems, outlines, summaries, detailed statements,

in layman's language. Translation is the intellectual process of changing ideas in communication into parallel forms.

There is always some skill involved in changing a communication to a parallel form, but, translation questions do not emphasize this aspect. For example, if students are asked to draw a picture representing ideas expressed in communication, the teacher is not so concerned with the quality of art as with the accuracy of the portrayal of the ideas. A student who has no particular art talent is not at a disadvantage.

A few examples of translation type of questions are given below :

1. Describe in your own words the reasons for the Second World War.
2. Draw a diagram of the human digestive system.
3. Explain, with the help of a picture on the board, the construction of houses at sea coast.
4. Point out on the map the coal mines in India.
5. Explain the following formula in words :



(iii) Interpretation Questions : The interpretation type of questions are those questions where students are required to relate facts, definitions, generalizations and values. It means that they should discover or use a relationship between two or more ideas. The interpretation question may give two or

more ideas and ask for the relationship and ask for another that follows from the evidence.

The ideas to be related may be simple or complex. The question is made more capable of involving students in the teaching-learning process by asking the students to relate a series of ideas in a variety of forms. The six forms of relationships listed below fall in the interpretation category:

1. Comparative relationship (Determining of ideas as identical, similar, different, unrelated or contradictory).
2. Relationship of implication.
3. Relationship of an inductive generalization to supporting evidence.
4. Relationship of a value, skill, or definition to an example of its use.
5. Numerical relationship.
6. Cause and effect relationship.

One of the characteristics of interpretation is that the student discovers or uses relationships in a common sense level. The emphasis in the question is on finding the relationship among the parts of the subject matter and not on formal understanding of the thought process involved. For example, a student can engage in induction without being able to define the process in logical terms.

There are two other characteristics of interpretation. First, the questions are explicit about what the student

should do. If a generalization, definition, value or skill is to be used, it is identified in the question, although the student may be expected to remember its meaning from previous instruction. Secondly, interpretation questions ask for a pattern of thinking that can be predicted in advance because there is usually one and never more than a few legitimate intellectual routes to the answer. This means that the question is objective in the sense that, there is one or possibly a few correct answers which can be justified beyond a reasonable doubt. The question may be in either short answer or essay format.

The following are the examples of interpretation type of questions :

1. Are climates of Gujarat and Uttar Pradesh similar ?
Give atleast two similarities.
2. Match the endocrine glands mentioned in column A with their functions given in column B.

A	B
Thyroid gland	1. controls the percentage of sugar in the blood.
Pituitary gland	2. affects the mental and physical development of the body.
Adrenal gland	3. controls the growth of the body.
Pancreas gland	4. controls voluntary muscles.
	5. develops female characters.

3. What are two points of similarity between the thoughts of Gandhiji and Karl Marx ?

4. Rewrite the following sentences, wherever necessary, supplying the correct information :
- (i) Vasco da Gama reached the port of Calicut with the help of an Italian guide.
 - (ii) The Portuguese rule was very generous.
 - (iii) The British established their first settlement at Chandranagar.
 - (iv) Pondicherry was the headquarter of the French.
5. State similarities and differences in the social policies of Akbar and Aurangzeb.

(iv) Application Questions : The 'application' type of questions require students to apply their knowledge into new life-like situations. These questions present problems that approximate the form and context in which they would be encountered in life. In an era of rapid change, educators are concerned about preparing students for life in an unknown future. The application category of questions is designed to give students practice in the transfer of training.

There are three main characteristics of the questions in the application category. First, these questions deal with knowledge which has explanatory or problem-solving characteristics. This is the kind of knowledge that is transferable to many new situations. Second, they deal with the whole of ideas rather than solely with the parts. In the early stages of the instruction of a complicated skill or

pattern of ideas, a teacher clarifies the intellectual process and knowledge into simple segments. This is a sound procedure if it is followed by application questions by asking students to reassemble the ideas and skills into their natural whole. The third characteristic is that application questions include a minimum of directions or instructions, because the questions are based on previous learning and the student is expected to know what to do.

A few examples of application type of questions are given below :

1. Give reasons for the following :

- (i) A burning candle keeps on burning in a covered jar containing a plant.
- (ii) Milk gets spoiled if kept for a long time.
- (iii) Pygmies do not need clothes.
- (iv) A pygmy's life is hard and short.
- (v) The camel is the most suitable animal for travelling in the desert.
- (vi) Days are very hot and nights are very cold in the desert.

2. How will you open a tightly corked bottle ?

(v) Higher Level Questions : This category involves three kinds of questions, viz., analysis, synthesis and evaluation. The thinking process involved in responding to these questions is of a high level and complex and hence these questions are

put under the category of higher level. Bloom (1956) stated that their categories are sequential and cumulative. In other words, each category of thinking has unique elements but also includes some form of all lower categories. Evaluation is at the top of all the categories. Analysis and synthesis are also towards the top due to which all the three categories are put as higher level.

The analysis questions require solutions of problems in the light of conscious knowledge of the parts and process of reasoning. In this category, there continues to be a concern for subject matter; but, in addition, the student must be conscious of the intellectual process he is performing and know the rules for reaching a true and valid conclusion.

In synthesis, the student solves a problem that requires original creative thinking. Synthesis thinking is fostered by a classroom atmosphere that seeks and rewards originality. These questions allow great freedom in seeking solutions. Another characteristic of these questions is that they have many possible approaches for the solutions. Synthesis calls for divergent thinking, which starts from a problem that offers a variety of possibilities radiating out to many satisfactory answers.

The third category involved in higher order questions, is evaluation. In this type of questions the student makes a

judgment of good or bad, right or wrong, according to standards which are set. In this way, it involves two steps in the process - first, to set the standards and second, to judge the idea whether it is according to the standards or not. Examples of higher order questions are given in the Appendix II.

(vi) Routine Type of Questions : This category includes those questions which are not related to the content matter, but are asked usually by the teachers in the classroom. Thus, these questions do not have any relationship with the earlier categories. That is why they have been put in a different category and, as they are not related to subject matter they are categorised as routine type of questions. A few illustrations of routine type of questions may make it clear which are as follows :

1. What do you do at home ?
2. Have you done your home work ?
3. Where were you yesterday ?
4. Did you follow ?
5. What are you doing ?

In the preceding paragraphs, the definition of question has been discussed. The classificatory system of questions has also been dealt with. What is needed to be discussed at this stage is rationale of taking up the present study. It is discussed in the subsequent section.

I.4 RATIONALE OF THE STUDY

The rationale of an educational research could be seen in terms of its contribution to the solutions of the felt educational problems, the way it adds to the existing funds of knowledge, the way it may systematize the practices of educational research and the way it may systematize the instructional process. For this purpose it is necessary to have an idea of the problems of educational system in the present conditions.

At present one of the burning problems is the inefficient organization of the instruction in the classroom to attain the set educational objectives. Therefore, one of the immediate tasks for educational researchers is to systematise the instructional process through scientific research. Any attempt at revitalising the instructional process, will necessitate more dynamic and scientific methods of teaching to be followed. The problem can be solved only when some effective methods of teaching are identified through well designed research in teaching and steps taken to disseminate and implement them. In this regard, in the last decade and a half, work has already started in India and its importance has been recognised. Efforts have been made to improve classroom teaching behaviour of teachers, considering it as one of the important areas. "Undoubtedly, the area of classroom behaviour is the most important area of educational research. Neglecting it we may parish and researching ^{we} it may redeem the profession by making it a scientific discipline,

since the quality of classroom transactions will determine the quality of our future generation and so our future world" (Buch, 1975). The research work completed in the area of teaching and teacher behaviour attempts to analyse and modify the classroom interaction in order to improve the instructional process. A careful analysis of interaction in any classroom instructional situation would invariably reveal that questioning is the most important aspect of verbal interaction, as it provides specific directions to the instructional process and also guarantees overt involvement of the pupils in teaching-learning process.

Questioning is used in the classroom to serve several purposes, viz., to motivate, to review, to summarise, to clarify and to assess. Added to this, it enables the teacher to come down to the level of students' understanding. In addition teacher questions attempt at stimulating and developing higher level of thinking. If one considers educational objectives particularly in the cognitive domain, viz., knowledge, comprehension, application, analysis, synthesis and evaluation which are to be achieved, then questioning could be one of the most effective ways to attain them. It is necessary to mention here, that, objectives in the affective and psychomotor domains are also equally important and may be possible to attain through questioning too. But, in the present study, the investigator has concentrated only on the cognitive domain to have better

understanding of the same and to avoid the complexity which might have arisen at the time of observation in analysing the questions for objectives in all the three domains. Through questioning these objectives could be achieved if appropriate questions are prepared and utilized in appropriate situations in a proper way. Researches have shown that different abilities can be developed using different types of questions. According to Francis (1968, 1970), analysis and evaluation types of questions influence pupils' achievement significantly and develop the ability of critical thinking. Sharma (1972) found that broad questions are more effective in attaining comprehension objective when compared to the narrow type of questions. Roy (1976) found that lecturing, questioning-response, and questioning-response-feedback have equal effect on development of knowledge, application and on total achievement of pupils. But, in case of comprehension, lecturing style differed significantly from questioning-response-feedback and gains were in favour of questioning-response-feedback. Marline (1976) found a significant gain in the development of student understanding of key biological concepts. It was found to depend on the level of questioning used in the classroom. A significant difference in student evaluation of teaching effectiveness was found to depend on the level of questioning used in the classroom. Smith's (1975) results indicated that taxonomy groups who used higher level questions gained higher than two recall groups. He suggested that higher

level questioning technique should be utilized. Tubb (1975) discovered that the students trained in problem solving approach took significantly less time to solve the problems during their second trial than did other students. The students taught through problem solving, achieved higher scores on problem solving items. Adams (1975) did not find any significant difference between the experimental and the control groups in the overall mean gain scores of critical thinking as measured by the Sequential Tests of Educational Progress, although it did reveal a trend toward increased critical thinking among the classes in which teachers used higher level cognitive questions. A significant relationship was found to exist between the cognitive level of teacher question and the student response. Furthermore, it was found that the correspondence between the cognitive level of the teacher question and the student response was greater in the classes in which teachers used higher level cognitive questions. The study supported the effectiveness of teacher's use of higher level cognitive questions in the development of critical thinking in students.

From the preceding discussion, it is evident that different educational objectives can be achieved through the proper use of different kinds of questions. This means that different kinds of questions have different potentialities in achieving pre-specified instructional objectives. If it is so, then, the basic question arises : 'Do the teachers use different kinds of questions

and offer all intellectual experiences in the classroom or they over emphasize some and neglect others ?' The answer to this question may be found by observing the teachers during the course of instruction in the classroom. Another issue concomitant with the one mentioned earlier is : 'How to make an appropriate use of a particular type of questions ?' For this purpose it is essential for a teacher to know the events which precede and succeed a particular type of question. This kind of knowledge would enable him to take decisions regarding the appropriate use of different kinds of questions. This process would lead towards a better understanding of questioning behaviour of teachers and thereby would help in systematising the instructional process. This understanding also would help in organising teacher education programme so far as this particular aspect, viz., questioning is concerned. If the teachers could be trained in the taxonomy of questions, they may use it in a number of ways to improve the intellectual/cognitive climate of their classrooms. But, these programmes to be organized in an efficient manner would also require the information about the association, which different kinds of questions may have with the variables like training, experience and subjects. The present study has been undertaken to provide answers to the above mentioned issues.

I.5 THE PRESENT STUDY

The present study which is entitled as, 'An Investigation into the Questioning Patterns of the Social Studies and Science

Teachers in the English Medium Schools' is an attempt to study the questioning behaviour of social studies and science teachers in the English medium secondary and higher secondary schools of Baroda, Ahmedabad and Rajkot. All the teachers of social studies and science in the above mentioned schools were observed through the modified version of Flanders Interaction Analysis Category System (FIACS). Their teaching was observed in the real classroom settings. Further, the questioning behaviour has been studied in relation to certain variables which were thought to be associated with the questioning behaviour, viz., subjects, training and experience. Accordingly, the questioning behaviour of the following groups was studied : (i) social studies and science teachers, (ii) trained and untrained teachers, and (iii) teachers having experience upto 5 years and the teachers having experience above 10 years. While studying the association of questioning behaviour with the one variable, other variables were controlled to increase the precision of the study. Alongwith this, it also attempted to study the extent of different kinds of questions for different groups. In addition to this, the patterns which different kinds of questions follow were also studied. For this purpose, the preceding and succeeding events of different kinds of questions were studied, because, each event at a particular moment influences the succeeding event and is influenced by the preceding events.

In this chapter the investigator has discussed the importance of the teaching and questioning, classification of questions, and rationale of the present study. In the next chapter the related literature of this area on teaching and questioning will be discussed.
