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CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

A critical comprehensive review of literature is sine-qua-non for any scientific investigation. Proper understanding of the problem requires a thorough analysis of the existing knowledge of the problem area.

Best (1978) defines review of literature as "a brief summary of previous research and the writings of recognised experts provides evidence that the researcher is familiar with what is already known, and with what is still unknown and untested. Since effective research must be based upon past knowledge, this step helps to eliminate the duplication of what has been done, and provides useful hypotheses and helpful suggestions for significant investigation".

The review of the literature promotes a greater understanding of the problems and its crucial aspects and ensures the avoidance of unnecessary duplications; it provides comparative data on the basis of which to evaluate and interpret the significance of one’s findings and in addition, it contributes to the scholarship of the investigator.

On keeping these important features of a review in mind, only those studies that are relevant, competently executed, and clearly reported were included in this chapter.

In the following sections of this chapter, the investigator provides a vivid description of an Ideal Educational Scenario, Teaching methods as envisaged in
NPE, studies on programmed learning, studies on cooperative learning, multimedia approach and also enumerates research areas relevant to the present study.

**Ideal Educational Scenario**

Children all over the world are innocent, vulnerable, and dependent human beings. There are curious by nature, active by temperament shining eyes that are full of hope. Their young year of life should be the time of joy and peace, of playing and enjoying, of learning and growing. They certainly deserve a future that is shaped in harmony and cooperation and to give every child a better and bright future is a challenge that has to be met by all the parents and teachers.

A traditional classroom situation comprises of at least four components.

i. The teacher
ii. The learner
iii. The subject matter to be taught and learned
iv. The communication system.

Wedemeyer (1967) has graphically presented this situation as follows.

**Traditional Classroom Teaching - Learning**

![Diagram of traditional classroom teaching and learning](image)
The formal classroom situation

This traditional model is the result of age old socially accepted norm, that traditional approach is the most important aspects of teaching learning and 'word of mouth' or face-to-face interaction facilitates maximum learning.

But the invention of printing, writing, telecommunication, educational technology, programmed learning, co-operative learning, and multimedia approach broke down the absolute monopoly of speech as the only medium of communication. This also broke down the absolute monopoly of the traditional approach over the teaching - learning process.

And these changes also made it possible to organise teaching-learning in different ways as presented in the figure given below.

Enrichment of Classroom Learning

![Diagram showing the enrichment of classroom learning](image)

Fig. 2.2

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Teaching Methods as Envisaged in National Policy on Education (NPE)

There are many methods of teaching. Teaching is defined in several ways. One of the ways is that teaching causes the students to learn. The learning process can be achieved in a number of ways. The choice of the proper method is determined by a variety of factors (The Encyclopedia of Education. 1971).

1. The type and size of the institution.
2. Level of the class.
3. Field of knowledge.
4. Facilities and financial support - library, teaching aids.
5. Teacher - student ratio.
7. Climate of Institution - faculty - student relation, institutional tradition and prestige.
8. Teacher based concepts of the purpose of education and how it can be best achieved.

The NPE has addressed most of the above issues and concerns, and also gives a picture of an ideal educational scenario.

Teaching Methods as Envisaged in National Policy on Education (NPE) 1986

The National Policy on Education stresses on child centred and learner centred approaches in Instructional technology.

The child as an individual has his needs, interests, attitudes which must be taken into consideration while transacting the curriculum. The teacher should create a warm and encouraging learning environment in the class and act as a facilitator in the learning process of children". 
Teacher as a facilitator should provide opportunities to learn things in a learning environment by widely using latest instructional technologies available in the classroom.

NPE emphasises that “each individuals growth presents a range of problems and requirements at every stage - from the womb to the tomb” . Education from the womb to tomb and individualised instruction are the latest concepts. Normal children can learn any area of concept by themselves at their own speed, provided facilities are available to them. Teacher as a facilitator has to provide opportunities for the child to learn things at school and home through the multimedia instructional technology with the help of audio-video equipments. This approach is what NPE advocates through its policy as child centred and activity based process of learning.

Our future society demands this since we require citizens with competencies, imagination and creativity. “Education is a unique investment in the present and the future” is the key note of NPE. This should be motto of the ideal educational scenario which can make the students to force the 21st century with confidence.

**Teacher - Pupil Relationship**

Although concepts like ‘de-schooling society’, schools without walls’ and ‘open education’ are gaining importance in the western world, classroom teaching will continue to be the most common form of instruction for many years. Barker (1982) says that the teacher initiates 55.2 % to 80.7 % of all the messages in the classroom. The communication cycle is initiated by the teacher as a result of teacher’s need to impart information or the students’ need to seek
information. According to Nuthall and Snook (1973), instructional activities of a classroom can be categorised into three basic forms:

1. Individual work which accounts for 25 to 45 percent of class time.
2. Extended discourse which accounts for 18 to 22 percent of class time.
   The teacher is found to be talking, performing, demonstrating or exhibiting materials most of the time in this activity.
3. Interactive discourse which accounts for 34 to 53 percent of class time when teachers and students are talking with each other.

   The act of teaching is a kind of reciprocal contact established between the teacher and pupil. This reciprocal contact can be perceived as a series of events which occur one after another. Classroom interaction refers to this claim of events, each one of which occupies a small sequence of time.

   An event may be defined as the shortest possible act that a trained observer can observe and record. In a normal class, the same sequence of events occurs again and again. Such a sequence may be called a pattern. Various techniques are used for studying the chain of classroom events. An observer sits in the classroom and keeps a record of the flow of events on an observation form. He is trained to use a set of categories. An analysis can be made of the frequency of each category and a profile of the distribution can be drawn. A single display will show how each event is a part of the chain.

   **Teacher’s Behaviour and Classroom Interaction**

   Teaching behaviour is an act of the teacher which occurs in the context of classroom interaction. Teachers behave in different ways and, therefore, there are different types of classroom interactions. Some teachers are very strict and some
are very kind and lenient. Some are witty and humorous and some are less initiative. There are some who are very stern and serious all the time. Certainly the teacher's behaviour pattern sets the pattern of pupils behaviour in a classroom. The teacher's behaviour tends to create an atmosphere which we describe as classroom climate.

Sundararajan (1991) classified the teacher's classroom behaviour into two categories-dominative and integrative. When a teacher talks, commands, restricts pupils' freedom to talk, he is dominative.

When he allows pupils to talk, ask questions, accepts their ideas and stimulates their participation in class activities, he is integrative. It is, therefore, the teacher's behaviour which sets the pattern for learning atmosphere or climate in the classroom. If he is generally dominant, he promotes such a climate in the class. If he is generally integrative, he aids in integrative climate.

Techniques of interaction analysis have been helpful in the analysis of teaching behaviour. Although only a small proportion of verbal communication is recorded, it is possible to infer about classroom events. It is possible to estimate the initiation and response on the part of the teacher and pupils and a number of other interesting features of teacher-pupil relationships.

**Flander's System of Interaction Analysis**

Of all the techniques of interaction analysis in connection with their respective studies, Ned A. Flanders' system (Flanders and Amidon 1963) is easy to handle and can be used as a feedback technique in teacher training. The Flanders' system is an observational tool used to classify the verbal behaviour of teachers and pupils as they interact in the classroom. Flander's instrument was designed
for observing only the verbal communication in the classroom and non-verbal gestures are not taken into account. The basic assumption of the system is that in the classroom the verbal statements of a teacher are consistent with his non-verbal gestures, or rather his total behaviour.

Flanders has categorised the interaction of teachers and pupils in classrooms. There are ten categories in the system.

Out of the ten categories in the system evolved by Flanders, seven categories are assigned to teacher talk and two to student talk and the tenth category classifies pauses, short periods of silence and talk that is confusing or noisy. The seven categories assigned to teacher talk are again divided into indirect and direct influence. Categories 1 to 4 represent indirect influence and categories 5 to 7 represent direct influence. Indirect influence encourages student participation and freedom of action. Direct influence increases the active control of the teacher and often aims at conformity and compliance. Direct influence tends to increase the teacher's activity and restrains student behaviour. The net effect is less freedom of action for the students.

The division of student talk into categories 8 and 9 provides a clue to the nature of freedom given to the students. Usually, but not necessarily, an excessive or above-average pattern of direct teacher influence is associated with less student talk. An above-average indirect pattern is associated with more student talk and this will be of self-initiated type. The use of only two categories to record all kinds of student talk neglects a great deal of information but the major purpose of this system is the analysis of teacher influence.
The purpose of category 10 is to record pauses, silence and periods of confusion. This is not intended to record longer periods of silence or confusion that exists for more than two minutes.

The major feature of this category system lies in the analysis of initiative and response which is a characteristic of interaction between individuals. To initiate means to make the first move, to lead, to begin, to introduce an idea or concept for the first time and to express one's own will.

"To respond means to take action after an initiation to counter, to amplify or react to ideas which have already been expressed, to conform or even to comply to the will expressed by others." Normally it is expected that the teacher should show more initiative than the pupils. With this ten-category system, it is possible to estimate the percentage of time of teacher talk, pupil talk and silence or confusion. An inference can be drawn from this estimate regarding the balance between initiative and response. With seven categories of teacher talk and only two of pupil talk, more information is brought about by the teacher. Hence with this particular set of categories, it is possible to study the influence of the teacher in the classroom different teaching methods result in different types of classroom interaction. Some of those methods are described as follows:

Programmed Learning: Review of Studies Conducted Abroad

Read and Hayman (1962) compared a three-month course using the programmed text books, "English 2600", with normal instruction in five schools, and found, in an overall comparison, that pupils using self instruction gained as much knowledge as thorough as taught by teachers. In an attempt comparing the efficiency of learning elementary statistics by scrambled test book and by lecturers, Smith (1962) found that the study through scrambled text book helped
in saving one third in the amount of time taken to reach the same level of attainment. Another remarkable finding was made by Perster and Sampson (1958), which states that Volunteer Harvard Students achieved the same reading knowledge of German by programmed methods as their fellows for home work during the normal period of formal teaching. The performance by programmed learning is better and helps in retention was found out by Gagne and Dick in 1962.

A study by Hughes and McNamara revealed that programmed instruction is more effective than conventional instruction and that the pupils learn in shorter period through programmed textbook. Carroll (1963) studied the relationship of ability to programme effectiveness. In college students learning a foreign language, Carroll found that the higher the ability, generally quicker the completion of the programme and higher the criterion test scores.

Lambert, Miller and Wiley (1962) studied the relationship of intelligence to programme acquisition. They studied this problem with an 843 frame programme on mathematics on a sample of 552 ninth-grade pupils. They found that the intelligence was the primary factor associated in the acquisition.

McNeil (1964) investigated the existence of sex differences in achievement in reading using programmed instruction. The investigation showed that boys showed significantly better scores on word recognition in kindergarten following programmed instruction, and girls made greater gains in reading in grade 1.
Keislar (1959) devised a programme to teach understanding of rectangles in the fifth and sixth grade class to find out the effectiveness of programmed instruction for teaching area of rectangles. His conclusion was that the group talking programmed learning had significantly higher gain scores than controls.

Keislar and McNeil (1961) taught molecular theory, particularly as related to evaporation and condensation, to a group of thirteen first-grade children, to test the ability to teach scientific theory to first-grade children with a programme. The study showed that the experimental group showed significantly greater gain scores than controls.

Home and Glaser (1958) reported a study in which comparisons were made between groups who learned by using programmed text books and groups who used standard text books. Two types of subjects matter were used. In both cases, the experimental groups showed greater gain scores than controls.

Goldbeck (1960) conducted a study to compare the effects of three different size of steps and the use of illustrations on the spelling achievement of V grade children. It is found that a greater number of errors was made on the largest step, unillustrated programme than on the smallest step, illustrated programme. Home and Glaser (1958) investigated the characteristic called ‘size of step’. The result shows that decreasing the size of step (and thereby increasing the number of steps) resulted in more efficient learning. Siegel’s study (1967) proved that individual instruction is highly influenced by factors such as classroom climate, learning environmental and educational ecosystems.
During 1980s some studies were conducted to find out the role of aptitude, affect and attitude in individualised learning. The importance of aptitude as the essential potential in achievement is realized by Robinson et al. (1980) and Stevenson (1983). The role of affective domain in individualised learning is studied by Holfstein and Lunetta (1983), Bartal and Ramu (1982). The role of attitude in self-learning is studied in 1984 by Touq and Lewis. All these experiments prove that aptitude, affective domain and attitude play a vital role in the effectiveness of individualised learning.

Review of Research work done in India

The movement of programmed learning came to India in early sixties. In 1963, some research students in the NCERT started working on the development of programmed learning material and took up research studies pertaining to the efficiency of programmed learning materials.

"Shah (1963) did the first systematic study in the field of programmed learning in India". She developed a programme on solving equations and compared its results against those obtained through conventional lecture method. Her findings showed that experimental group taught through programmed material achieved more in less time.

Mullick and Kulkarni (1968) investigated the effectiveness of programmed learning material (PLM) in a correspondence course situation. Their findings reveal that PLM proved more useful than conventional material. Gupta (1965) found that even adapted programme can give good results. The advantage he pointed out was that adapted versions save much of our time and energy, which can be used for other PLMs essentially needed for Indian Schools.
The studies of Sharma, Desai and Gibson (1965) confirm the view that performance is better when taught thought through PLM.

In 1967 some of the enthusiastic persons interested in programmed learning movement formed as association of programmed learning now registered as the Indian Association of Programmed Learning (IAPL). The association is doing very useful work in organising annual conference on programmed learning and mobilising researches for preparing programmed material on different units of curriculum.

Diwan and Kulkarni (1967) have explored the possibility of applying programmed learning principles to TV instruction. The findings show the superiority of experimental group over conventional TV lesson group. The effectiveness of programmed learning approach was studied both in terms of immediate scores in the post-test and in terms of retention. Sharma (1966) and Kulkarni (1969) found that retention of scores of the experimental group was better than those of the control group. Their experiments proved that the programmed learning approach is effective not only in terms of immediate and delayed achievements but also in terms of the time taken to learn a particular topic.

The Centre for Advanced Studies in Education has taken up programmed learning as a major field of research. During 1970s and 80s many research studies have been taken up both at M.Ed. and Ph.D. levels - throughout the country, out of which the important ones are mentioned below:
1. During (1977-81), Inamdar and Janakal Ambal studied the effectiveness of programmed learning strategy in the subject of mathematics for standard VII in relation to some psychological correlates.

2. In 1981 Mavi and Nirmal Singh (Kurushetra University) developed a programmed text in physical geography for high school students.


4. In 1984, Sharma and Jagannath (Punjab University) studied the effectiveness of density of programme and time in remedial teaching in a segment of English Syntax at the pre-university level.

5. In 1987 Gautham and Pushpa (Himachal University) developed a programmed instruction in linear and branching styles and studied the performance in relation to creative thinking and level of aspiration.

6. Desai's (Bombay University 1986) work shows that programmed learning strategy is more effective in learning of Physics in the 11th class.

7. Mennakumari (Gauhati University, 1989) developed and tested the effectiveness of programmed learning material in syllabus of the principles of Education on B.T. courses of Gauhati University.

8. During 1986-88 Roy and Biswanath (Visva Bharathi University) studied the effectiveness of programmed text in minimising individual difference.
9. In 1987, Kalachery and Kunjamma prepared a programme instructional material in the syllabus of Chemistry prescribed for Class VIII to Maharashtra state.

10. "In 1988 Singh and Rajkumar (Gorakpur University) studied the relative effectiveness of programming styles at various levels of intelligence".

All the above mentioned researches shows that programmed materials can increase the effectiveness of individualised instruction, because as tangible, reproducible, devices, they can be severely tested, evaluated, improved and redesigned.

In Indian campuses, though lecture-cum-demonstration and laboratory work go along with classroom lectures, the latter method of science teaching still predominates and at time eclipses the former as role method of classroom instruction.

That does not mean the lack of awareness of the merits of other strategies (Ahmed, 1985), but an attempt to break the set tradition is still lacking. Often, the curriculum in most universities is defined in terms of content coverage rather than of methodology and the least, the self-instruction methods.

Grabriel and Pillai (1982); Siddiqui and Mathur (1983) introduced individually guided system of instructions in India. But the researches are focused mostly in establishing the effectiveness than the in-depth analysis of the components that contribute to the effective teaching-learning process.
In India, researches on 'programmed learning' started in 1960s. So far many attempts were made to study the effectiveness of programmed learning materials in individualising instruction. But the number of programmed learning materials developed in India is very few when compared to that of Western countries. In India, there is severe scarcity of suitable programmed learning materials based on the prescribed syllabi. So there is enough scope and need to prepare programmed learning materials to meet the requirements of Indian classroom situations. Moreover these students seldom explore the impact on attitude of the learners. The current study investigates the impact on better achievement and attitude. Having described the review on programmed learning, the review of the study related to cooperative learning is made in the following section.

Cooperative Learning

Research and development on cooperative learning methods and their effects on pupils in classrooms have their roots in work done decades ago. Cooperative learning underwent a renaissance and has generated considerable interest among educators responsible for the daily work of instruction as well as among researchers concerned with a wide range of education, psychological and social issues. Foremost among these issues are the improvement of student academic achievement and promotion of high level thinking as well as positive interpersonal and inter-group relations among students in school. Hence much research conducted on the effects of cooperative learning was motivated by the desire of researchers to cope with the problems confronting public education in many countries today. This fact probably lends the research in this field, a certain sense of urgency.
Over the past 15 years there has been a keen interest in cooperative learning methods designed for use not as a supplement to traditional instructional methods but as coherent alternative means of organizing the classroom for instruction in fundamental curriculum areas, from mathematics to language arts, science and social studies. This renewed interest has led to an outpouring of research on cooperative learning and related issues. Research on cooperative learning has been reviewed in several places in recent years, all over the world. (Johnson, Maruyama, Johnson, Nelson & Skon, 1981; Slavin, 1983, 1983; Webb, 1985).

This research has established that under certain circumstances the use of cooperative learning methods increases student achievement more than traditional instructional practices. In addition, those methods consistently improve students' self-esteem, attitude, managerial skills, leadership qualities, inter-personal and social relations among students.

Perspectives on Cooperative Learning

Developmental Perspectives: The fundamental assumption of the developmental perspective on cooperative learning is that interaction among children around appropriate tasks increases their mastery of critical concepts (or) skills. In the developmental perspective derived from the theory of Vygotsky (1978), it is viewed that the collaborative activity among children promotes growth because children of similar ages are likely to be involved within one another's proximal zones of development. Vygotsky described the influence of collaborative activity on learning as follows:
"Functions are first formed in the collective form of relations among children and then become mental functions for the individual. Research shows that reflection is spawned from argument".

**Motivational Perspectives**: Motivational perspectives start from a different milestone than do developmental perspectives. When developmentalists focus primarily on the quality of interactions among the students engaged in collaborative activities, motivationalists are more concerned with the reward (or) goal structures under which group members operate. The researchers working from a motivational perspective like Johnson *et al.* (1981) and Slavin (1983) found that co-operative goal structures create a situation in which the only way the group members can attain their own personal goals is through interpersonal reward structure in which group members will give or withhold social reinforces in response to their group members' efforts.

According to the motivationalist perspective (Slavin, 1983), two elements are required to make cooperative learning more effective than traditional instruction; group rewards and individual accountability. Group rewards provide an incentive to the cooperating group to encourage and help the members to help the group to succeed.

**Cooperative Learning in High School**

Luallen and Leonard (1991) adopted cooperative learning as one of the techniques to improve the learning of mathematical and science concepts of students at the junior high school level. They observed the following benefits from the use of cooperative learning:
i. Students become actively engaged in the task.
ii. Positive interactions occurred among students.
iii. Students displayed a positive attitude toward science.
iv. Students took more responsibility for their own learning.
 v. Students felt free to question and probe in a non-threatening atmosphere.
vi. Students' self-esteem is enhanced.
vii. Students' active involvement resulted in fewer discipline problems.

Putnam and Markovshick (1989) report that the students in cooperative classes experience greater decreases in alienation or feelings of estrangement from school, peers, and classroom activities than in other classes. They also experienced greater feelings of positive interdependence with their classmates than students in other classes. On reviewing more than 50 empirical studies on the achievement of Mexican Americans, Hernandez and Descamps (1986) observe that cooperative learning environments produce greater academic gains than competitive or individualistic learning environments for all students.

Cooperative Learning and Student Achievement

In many of the recent studies conducted in the classroom situations, cooperative learning methods are suggested as means of introducing higher level skills into the curriculum. They also ensure students adequate level of basic skills and given them collaborative skills necessary in an interdependent society (Slavin, 1989). According to Slavin (1989), there are two conditions essential in order to realise the achievement effects of cooperative earning. Firstly, the cooperative groups must have a group goal. Secondly, the success of the group must depend on the individual learning of all group members. That is, there must be individual accountability as well as group accountability.
Humphreys, Johnson and Johnson (1982) and Lazarowitz, Hertz-Lozorowitz and Jenkins (1985) predict that students who study biology in cooperative small groups will demonstrate highest levels of academic achievement as well as improved inquiry skills and higher level of self-esteem. These outcomes, according to them, can be understood as resulting from greater student involvement in learning, a sense of personal responsibility for learning as compared with their peers.

Johnson (1976) found that students perceived inquiry oriented science classes as more cooperative than classes where only textbooks were used. He also felt that an inquiry approach to the study of science shows some kind of cooperative spirit in the classroom. These views were supported by Maukoos and Penick (1983) who reported that in the classrooms which were characterised by an inquiry mode of learning, student interaction and cooperation, the students demonstrated a higher level of achievement. Lazarowitz and Karsenty (1990) implemented cooperative learning in tenth-grade biology classes and evaluated many different potential effects of cooperative learning on the students. They showed that cooperative learning in high school is feasible and potentially productive. The results of their study showed that academic achievement of students taught in a cooperative setting was superior both statistically and qualitatively from a pedagogical point of view.

Newmann and Thompson (1987) reviewed 27 studies based on cooperative learning. These studies dealt with classes 7 to 12 in subjects ranging from mathematics and science to language arts and social studies. The overall results in 68 percent of the studies indicated that cooperative learning was found to be more successful in terms of academic achievement than the techniques to
which it was compared. They also concluded that the successful application of cooperative approaches will require significant teacher preparation on how to orient high school students to new classroom procedures as well as teaching students "specific cooperative skills".

Humbreys (1982) studied the effects of cooperative learning on students' achievement in science class. The results indicated that cooperative learning experiences promoted mastery and retention of material taught and positive attitudes toward the experience, than other competitive and individualistic learning experiences.

Although significant achievement differences among student cooperative learning groups were not realised in a study of middle school students. Phelps (1990) suggested that cooperative learning techniques may be more appropriate instructional strategies than traditional methods for use with eighth-grade level students.

In a descriptive study of a cooperative learning structure related to student achievement and teacher attitudes in fourth grade spelling, Snodgrass (1991) found that cooperative learning enhanced students' achievement in spelling and also supported the view that cooperative learning is an effective instructional technique for application in the elementary spelling classes. Nederhood (1986) analysed the effects of cooperative learning technique on achievement and attitude outcomes of seventh grade students. This study found significant higher academic expectations, increased number of friends and increased self-confidence. However, no significant differences were found for academic achievement measures.
Cooperative Learning and Science Instruction

Leduc (1990) studied the ways of teaching science to students with limited English proficiency using cooperative learning techniques. Results of this study indicated that a comprehensive programme using bilingual cooperative learning and active involvement of all students in a wide range of instructional activities will better meet the needs of students with limited English proficiency.

Leach (1992) felt that cooperative learning is an important approach in learning among the recommended pedagogical and curriculum changes involved in restructuring science education to increase the attention of students. While comparing cooperative and non-cooperative learning techniques on the achievement and attitudes of college students in science, Haber (1991) found that cooperative learning improves academic achievement as much as traditional methods. In general, he found that, both treatments were equally effective in improving student understanding of chemical principles and in developing improved attitudes towards science and the environment.

Cooperative Learning and Social Skills Development

Kaminski (1991) conducted a study to analyse the effect of teaching group social skills and group roles on the achievement level of high school students who were working in a cooperative learning structure. No statistically significant differences were found between the experimental groups, which were taught group social skills and group roles; and the control groups which did not receive any special training.
In a case study conducted on implementation of cooperative learning, Manning (1990) reported that more teachers of elementary level and a few teachers of secondary level continued to use cooperative learning than was expected and the problems in implementation were overcome by themselves without the support of others.

Cooperative Learning and Other Areas

Obiekwe (1992) studied whether the use of a cooperative learning instructional strategy was more effective than the use of a traditional method in increasing the college students' achievement in algebra. In this study no significant difference in mean achievement was found between the subjects in the two methods of teaching. Also no significant difference in achievement was found between female subjects in the two methods.

Lee (1992) compared the effectiveness between the cooperative and individual learning on students' achievement and attitudes on the computer assistant mathematics problem solving task through cooperative learning.

Dailey (1991) tested the relative efficacy of cooperative learning versus Individualised learning on the written performance of adolescent students with writing problems. It was found that cooperative learning was effective in producing quantitative and qualitative changes in the writing of students with writing problems using word processing.
In a study to determine whether using cooperative learning in a traditional secondary social studies class would have a positive effect on student achievement and attitude, Rasters (1990) found that cooperative learning did not have a significant effect either on achievement or attitude.

Mani and Muthaiah (1993) found cooperative learning strategy as an effective training methodology at the Bachelors and Masters of Education courses.

Muthaiah (1994) studied the effectiveness of cooperative learning strategy in enhancing achievement in mathematics and social interaction of high school students in Coimbatore. This study indicated that the cooperative learning was very effective in enhancing student achievement.

Multimedia - Meaning and Definition

The present century is rightly called technological century due to the influence of advancements in the field of science and technology on the varied aspects of life, resulting in its modernisation. The impact of scientific and technological advancements on education is so great that it has given rise to a new discipline called Educational Technology.

Today's class room practices are quite different from those of yesterday. Similarly, the class room practices in the coming century may be quite different from those of today. One can easily find out the explanation for these differences in the obvious impact of technological innovations and inventions. The shape of future school, Colleges and Universities is bound to change radically due to
technological impact in the years to come. There is a greater need to gear education and teacher education to meet the future requirements of the society utilising the technological devices and chances.

Educational technology has revolutionised the educational system. It has come in to stay for ever for the enrichment of educational and instructional processes. It has greatly influenced the teaching learning process.

The major problem of teaching in our Schools is how to accommodate instruction to individual differences of the learners. Educational Technology has developed new innovative practices and strategies for this purpose. One such strategy is multimedia based modular approach.

Multimedia means making appeal to different senses instead of one as in the traditional method. Multi-media includes High Technology Instructional Media (HTIM) and low Technology instructional Media (LTIM).

In teaching learning process in class room situation different media are used viz., T.V., Video, Computer, Teaching machine, films. Film strips and other projected and non projected aids to make learning more effective. This not only makes communication effective and impressive but also helps in motivating the children and creating interest in the lessons. It also helps in understanding unfamiliar situations and aids in building concepts and development of creative thinking. Besides, it ignites the spark of curiosity.

Further, the use of multimedia facilitates in overcoming certain inadequacies and deficiencies of the school system. The audio-visual aids make the learning more effective particularly the individual and group learning.
Under teacher-student interaction, it provides opportunities for teachers and students to work together in small groups to discuss, to question, to report, to be evaluated or to engage in other forms of personalised interaction outside the classroom experience. Thus, the multimedia can bring forth better progress and developments in educational system.

Samanta (1991) felt that the traditional teacher depends on verbal exposition. Considerable visualisation of objects and process is essential for formulation of accurate concepts among the students. A teacher using multimedia can make even difficult concept clear to a below average student easily.

Moreover, in this fast developing world it is unreasonable to expect that the spoken or written word alone could convey the volume of relevant information to the learner. The role played by multimedia packages for educational purposes is highly significant. It helps to overcome barriers. It goes beyond the four walls of the classroom. It fulfills the gap in learning. Difficult processes can be shown with ease and inaccessible places can be viewed by sitting in the classroom itself.

Multimedia devices are more capable of penetrating deeply into human character with an immediate excitement than any other medium.

Studies Conducted in India

The studies on multimedia conducted in India are presented under the following sub heads:

1. Studies conducted on Multi-media in Formal Education
2. Studies conducted on Multi-media in Non-Formal Education
1. Studies Conducted on Multi-media in Formal Education in India:

Ahuja and Ahuja (1985) conducted a study on "Demonstration of audio-visual and reading aids to school students and their reading speed in three languages - Kannada, Hindi and English".

One of the main objectives of the study was the general evaluation of the audio-visual aids:

The major findings of the study were:

i) The closed circuit programme was liked by the students and was found to be very effective both from the language and comprehension point of view by more than 95 per cent of the students.

ii) The students were not much benefitted by the three films on reading purchased from an outside source.

Antonisamy (1989) studied the effectiveness of teaching environmental concepts to school drop-outs through video and charts.

The main objectives of the study were:

1. To prepare a video programme on various environmental concepts for school dropouts.

2. To prepare charts on various environmental concepts for school dropouts.

3. To study the effectiveness of teaching environmental concepts through video and charts. The main findings of the study were as follows:
i. Teaching the environmental concepts to the dropouts through video was more effective than teaching the environmental concepts through charts.

ii. Teaching the environmental concepts to the dropouts through video was found to be effective.

iii. Teaching the environmental concepts to the dropouts through charts was also found to be effective.

iv. Teaching the environmental concepts to boys and girls through video was found to be effective.

v. Teaching the environmental concepts to boys and girls through charts was found to be effective.

Shah and Mandal (1993) made a study on 'Effectiveness of three Instructional Strategies for Higher Education'. Lecture-cum-live demonstration, video film and booklet were the strategies followed.

They found that video film was the best strategy followed by lecture cum demonstration and booklet methods. They suggested that video technology should be made more available to the educational institutions.

Bhatt (1992) conducted a study on "Effectiveness of three modes of teaching science on students' achievement". The following were the objectives of the investigation:

i. To develop video cassettes of TV lessons covering ten lessons of selected topics in standard X Science.
ii. To teach the students in three groups through the following modes:
   a) TV lessons with guidance notes;
   b) Experiments, charts and demonstration; and
   c) Lecture-cum-discussion.

iii. To compare the results of learning in different ways i.e., to find out the
   a) Comparative effects of learning through three different modes;
   b) Comparison of results of two sex groups; and
   c) Inter-section comparison of results of three sections, viz., Physics, Chemistry, and Biology.

The major findings of the study are given as follows:
1. TV lessons were more effective than lessons taught through experiment-cum-demonstration and lecture cum-discussion methods.

2. TV lessons were found quite feasible and useful for secondary school students, in science education; their usefulness would increase if they are prepared with utmost care.

3. As regards to the different sex, no clear-cut evidence of difference in performance was found.

4. The significance of differences between different sections of science, i.e., Physics, Chemistry and Biology reveal that there was no single evidence of significance of difference between Physics and Biology. In few cases, the significance of difference between Physics and Chemistry as well as Chemistry and Biology was seen.
5. Opinions regarding the TV lessons indicated that they were found quite interesting to the participants, and they warmly welcomed learning through this type of lessons.

6. The order of the methods, in view of preference and as assigned by the participants, was found as under:
   a) TV lesson
   b) Experiment-cum-demonstration method, and
   c) Lecture-cum-discussion method.

Desai (1985) conducted “An investigation into the efficiency of different instructional media in the teaching of science to the pupils of class VIII in relation to certain variables”.

The major objective of the study was to compare the achievement of pupils in science learning through different instructional media and the traditional way of teaching.

The major findings were:

i. Programmed learning approach was more effective than the traditional way of teaching science.

ii. Studies with discussion approach was more effective than traditional approach.

iii. The experimental approach was more effective than traditional way of teaching science.

iv. In teaching science, the experimental approach was the most effective of all the approaches.
A study by George (1966) entitled, “An enquiry into the scope and effectiveness of audio-visual instruction in improving English teaching in Kerala State in the first three years of school course”, concluded the following:

i. Teacher did not use audio-visual aids because of heavy cost, heavy syllabus, insufficient number of material aids and lack of skill and special training.

ii. Pupils taught by using audio-visual aids achieved higher than those taught by the usual method and the use of audio-visual aids did not require more time when compared to ordinary teaching.

Golani (1982), studied “The Use of Audio-Visual Aids in the Secondary School of the District Thane”. The objectives of the study were:

i. To create awareness amongst teachers and school heads about the importance of audio-visual aids.

ii. To help raise the academic standard of secondary school of Thane District.

iii. To know the existing situation regarding audio-visual material in the Secondary School.

iv. To elicit the opinions of Headmasters and teachers about the measures for providing better and improvised material for audio-visual education.

The main findings of the study were:

i. According to the opinions of the Secondary School teachers, teaching aids were essential and useful in developing clear concepts and stimulating learning.
ii. Audio-visual aids were expensive and some schools could not afford for them.

iii. The audio-visual aids were not available in rural areas due to transport difficulties.

iv. Teachers lacked time to prepare the aids.

v. No incentive is given to teachers for using teaching aids.

vi. Good use of aids could be realised if only teachers were thoroughly trained.

A study was conducted by Hiaman and Purushothaman (1988) about "the instruction through interactive video". It highlights the effectiveness of instruction through interactive video in developing the skills viz.

a) Keen observation  
b) identification of a problem,  
c) inference drawing,  
d) formulating hypothesis  
e) divergent thinking  
f) generalisation.

The analysis of the data revealed that pupils in the experimental group developed the above mentioned skills better than control group pupils. The more interesting part of the study is that there were very interesting correlations within the skills chosen for development in the experimental group. This paper further suggests suitable strategies for instruction through interactive video.

Idayavani (1991) conducted a study on "Developing a Video programme on weathering and work of the rivers in physical Geography for higher secondary students". The main objectives of the study were:

a) To prepare a video a programme on weathering and work of the rivers for instructional use for higher secondary students of the second year.

b) To find out whether the students improve their achievements after viewing the video programme on weathering and work of the rivers.

c) To find out whether the male and female students improve their achievement after viewing the video programme on weathering and work of the rivers.
The main findings of the study were:

i. The students improved their learning of the concepts of weathering and work of the rivers after viewing video programme.

ii. The male and female students taught by video method are equal in their learning the concepts of weathering and work of rivers.

iii. The students taught by video method performed better than the students taught by traditional lecture method in the learning of the concepts of weathering and work of the rivers.

Jayalakshmi (1992) developed a video programme and measured its effectiveness in teaching balanced diet to Higher Secondary Home Science Students and Community People.

The major findings of the study were:

i. The higher secondary home science students significantly improved their learning in balanced diet after teaching through traditional lecture method.

ii. The higher secondary home science students improved their learning in balanced diet after teaching through video method.

iii. The community people significantly improved their learning in balanced diet after teaching through traditional lecture method.

iv. The community people significantly improved their learning in balanced diet after teaching through video method.

v. There is a significant difference in the learning of balanced diet by higher secondary home science students taught through traditional method and video method. The achievement of the students in balanced diet is higher in video method than in traditional lecture method.
vi. There is significant difference in the learning of the balanced diet by community people taught through traditional lecture method and video method. The achievement of the community people in balanced diet is higher in video method than in traditional lecture method.

Kalimuthu's (1991) study on “developing a video programme on environmental pollution in biology for higher secondary students” reveals the following findings:

i. Both the male and female students improved their learning of the concepts of environmental pollution after viewing the video programme.

ii. Both the male and female students learned more concepts of environmental pollution when they were taught by video method than the traditional lecture method.

A study was conducted by Kumar (1981) about the effectiveness of self-instructional audio-cassettes in developing teaching skills among students with the following objectives:

i. To develop instructional materials for the skills of questioning, explaining and illustrating with examples.

ii. To prepare audio cassettes of the instruction materials for the above mentioned teaching skills.

iii. To develop the above mentioned skills with examples through self-instructional audio-cassettes.

iv. To examine the effect of such audio-cassettes on the general teaching competence of student teachers.
The main findings were:

i. The experimental groups exposed to both treatments did better than the control group.

ii. The self-instructional audio-cassettes were effective for developing different teaching skills.

iii. Immediate feedback through audio cassettes was an effective way of improving the performance of student teachers in the use of different teaching skills.

Oberai (1981) studied the development of Radio vision as an instructional system with the following objectives:

i. To compare the radio-vision method of instruction in terms of academic gains on the part of the subjects.

ii. To compare radio-vision as a medium of instruction to other classroom methods in terms of academic gain on the part of the students.

The major findings of the investigator were:

i. The radio-vision group obtained significantly higher mean scores on the recognition test than the conventional lecture group.

ii. All the radio-vision groups except black and white radio vision group obtained significantly higher mean scores than the group receiving instruction through the traditional method in the final experiment.

iii. Group of colour radio-vision plus work book obtained significantly higher mean score in the recall test than the other group.
Ramachandra (1982) studied the use of visual aids by teachers of University of Agricultural Sciences, Bangalore. The study revealed the following:

i. Visual Aids use level index was low in basic sciences and humanities when compared to agricultural colleges, veterinary colleges and fisheries colleges.

ii. The association between the age of teachers and visual aids use level was not significant.

iii. The association between visual aids use indices and teachers qualifications, training, status was significant.

iv. Other factors i.e., number of times the course offered and number of students per class, did not have significant association with the visual aids use level.

v. The association between the visual aids use level and the visual aids determinant was positive and significant.

A study done by Dasgupta (1989), aimed at comparing the Personalised system of instruction (PSI) with conventional method (lecture discussion) for technological curriculum on a more rigorous basis and collecting detailed feedback from the technology students.

The results of the study show that the performance of the PSI sample was significantly better than that of the conventional sample.

Sastry (1982) used toys/models and figures to teach children. The children who were taught using models, toys and figures had better achievement in the post-test than those taught without the visual facilities.
Toys, models and figures are therefore, effective instructional media when compared to conventional lecture method.

Sethi (1976) studied a programme in English spelling in relation to visual and auditory presentation with the following objectives:

i. To find out the relative merits of visual and auditory models of presentation for learning programmed materials.

ii. To find the comparative effects of visual and auditory models of programmed materials between boys and girls.

The major findings of the study were:

i. Auditory mode was found superior to the visual mode.

ii. Girls performed better than boys.

iii. There was significance between auditory and sex interaction. Auditory time factors were not found significant.

iv. Boys seemed to perform better on delayed test.

Joshi (1992) conducted a study on “Effectiveness of School Television Programmes in Science” with the following objectives:

i) To study the STV programmes in science at the secondary school level in terms of:

i) Instructional objectives

ii) Number of programmes telecast

iii) Content - coverage, adequacy and accuracy
iv) The extent to which media attributes and limitations of television are being taken care of.

v) Suitability of the organisation of learning experience.

vi) Resources involved in production and related problems.

2) To study the impact of STV programmes in sciences at the secondary school level on the students' performance in terms of:

i) Scholastic achievement (as related to the exposed topics)

ii) Scientific attitude

The findings of the study are given as under:

a) The frequency of the STV programmes was insufficient

b) The content of the STV programmes was adequate as well as accurate.

c) For the selection of the topics for STV programmes, the attributes and limitations of the medium (television) were mostly considered but many a time they had been overlooked due to certain handicaps. The procedure employed for the selection of topics for STV programmes was found to be appropriate.

d) The allotment of topics was sometimes in accordance with the interest of the personnel but always in line with their capability and mostly in tune with feasibility.

e) There is a need for time to time orientation and rigorous training of the persons involved in the planning, production and utilisation of the STV programmes.

f) The TV branch and the STV unit in the TV centre are the two main bodies involved in STV programmes.
2. Studies conducted on Multimedia in Non-Formal Education in India

Baskar (1990) studied the effectiveness of teaching social concepts to the working children through video method. The major findings of the study were as follows:

i. Teaching the social concepts to the working children through video was more effective than teaching by traditional classroom method.

ii. The male children learned more social concepts than the female children when they were taught by video method.

iii. There was no difference between male and female children in learning the social concepts when they were taught by traditional classroom method.

Bhangoo and Kaur, (1989) studied the effectiveness of Educational Video Films in Home Science for Rural Women - an action experiment. The findings were:

1. Video film when used alone can be an effective method of teaching and that adult rural women gain a significant amount of knowledge by this method. It is specially recommended for such topic as the 'use of colour' which are difficult to create in the classroom situation and can be best presented through actual settings shown through film.

Cherian (1986) conducted a study to analyse the selected health and hygiene, nutrition and family planning programmes by television and its impacts on acquisition of knowledge by rural people of the selected village of Kheda District, Gujarat State, India.
The study showed that the women gained more knowledge than men by viewing the TV programme. TV viewing helped the women and men to gain significant amount of knowledge about green leafy vegetables, polio vaccination and Laproscopy.

According to Holtzman (1981) the results of numerous studies done in India to investigate the role of television in the learning process, point to the effective role of this medium in creating general awareness and increasing knowledge. Television as a medium cannot bring about behavioural change unless supported by a interpersonal face to face network. It can help to develop a positive attitude. It can open a window to the world. In this function of incidental learning, television success is influenced by a variety of factors including the role assigned to education by a society and the inter-relationship between the educational and media systems.

Mullick (1981) developed learning materials for non-formal education of girls in the age group of 11 to 14 years in rural areas on health education. The study was divided into two phases. The first phase was study of effectiveness of tape-slide presentation for teaching illiterate children. The second phase was the study of attitude of teachers towards the use of tape-slide learning materials in non-formal education.

It was found that the tryout of the tape-slide programme on 11 to 14 years old girls outside school was effective and that the tape-slide presentation was a viable means of teaching illiterates without assistance of a teacher. It was also found that the teacher-trainees felt that tape-slide materials were useful for making the lesson interesting and more useful in large classes.
Joshi and Gupta (1993) conducted a study on “Effectiveness of Video in Educating Women of Low Socio Economic Status”. The improvement findings of the study were:

i. Video films can be effective in imparting knowledge to the women in non-formal education.

ii. Video films can be produced on the content relevant to the needs of the various groups of women so that they may be well accepted as one of the effective media for education.

iii. Since women have shown high interest in income generating activities, such activities can be taken up in various adult education centres run by Home Science Education and Extension Department and other agencies.

iv. A video film scripted and produced considering all such aspects can ensure its effectiveness.

Sinah (1983) found out that if use of any media treatment in the teaching-learning process is capable of creating ideal classroom situations, it would also be helpful in achieving high scores.

Education has always acknowledged the versatility and efficiency of multi-media communications. One may say that the movement of educational technology is today multi-media based Shukla, (1983). Vardhini (1983) developed and tried out ‘a multimedia instructional strategy’ for teaching science at secondary level’. She suggested that for achievement of different instructional objectives, multimedia strategy can be implemented at school level without having to spend too much money or time.
According to Brown (1983), in his concept on Systematic Approach of Instructional Technology, the central focus is upon students - their needs, capabilities, and achievements - as they work toward desirable levels of competence or performance. It is noted, that the figure 23 calls for answers to four fundamental questions:

1) What goals are to be achieved?
2) How, and under what conditions, will students seek to achieve those goals?
3) What resources are required for necessary learning experiences?
4) Outcomes: How well were goals achieved? This process also provides guidance in necessary improvements in the instruction; What needs to be changed?

To answer the questions, seven steps in instructional development are recommended:

1. Define (or accept) objects and select content to be studied.
2. Select appropriate teaching-learning experiences and seek to individualise them.
3. Select one or more appropriate teaching-learning modes in which to carry out learning.
4. Assign personnel roles.
5. Select appropriate materials and equipment.
6. Choose physical facilities for the learning experiences.
7. Evaluate results and recommend improvements.
Systematic Approach of Instructional Technology

**A. GOALS**
What goals are to be achieved?

- Objectives
  - Knowledge
  - Attitudes
  - Skills

- Content

**B. CONDITIONS**
How and under what conditions, will students achieve objectives?

- Learning Experiences
  - Teaching
  - Learning Modes

- Personal

**C. RESOURCES**
What resources are required for necessary learning experiences?

- Materials and Equipment
- Physical Facilities

**D. OUTCOMES**
How well were objectives achieved?
What needs to be changed?

Fig. 2.3
Structuring learning experiences

Figure 2.4 describes "relationships of objectives and teaching learning modes". It stresses two points: There are different types of teaching and learning objectives; and there are different modes in which to organize and conduct learning experiences to achieve those objectives. The lower section of the chart suggests that there are different kinds of instructional modes - those involving the teacher alone, those in which student-teacher interaction or student-student interaction is present, and those in which students work alone.

Experiences leading to learning

Brown lists the following tasks as experiences leading to learning:

- Thinking,
- Speaking,
- Writing,
- Listening,
- Taking Notes,
- Designing,
- Lettering,
- Exhibiting,
- Mapping,
- Presenting,
- Experimenting,
- Collecting,
- Exchanging,
- Dramatizing,
- Imagining,
- Summarizing,
- Judging,
- Discussing,
- Reporting,
- Editing,
- Interviewing,
- Constructing,
- Drawing,
- Photographing,
- Graphing,
- Demonstrating,
- Informing,
- Researching,
- Observing,
- Audio Recording,
- Singing,
- Visualizing,
- Computing,
- Evaluating,
- Conferring,
- Reading,
- Scripting,
- Outlining,
- Creating,
- Painting,
- Displaying,
- Charting,
- Showing,
- Instructing,
- Problem Solving,
- Watching,
- Video Recording,
- Dancing,
- Organising,
- Programming,
- Working.

He enumerates the many different types of activities which, if thoughtfully and appropriately planned, can lead to desired learning. A n introspection should be made on the following lines of thinking. Has anything been omitted which the
Interrelation between Objectives and Modes of Learning

A
Cognitive Objectives
Knowledge
Information

B
Affective Objectives
Appreciations
Attitudes

C
Psychomotor Objectives
Performance
Skills

X
Large or Very Large Groups
Face-to-face or mediated

Y
Small or Medium Groups
Face-to-face interaction (sometimes mediated)

Z
One Student
Independent study with resources (mediated)

Fig. 2.4
teacher considers to be an important learning experiences? Does this list help to remind him/her that many different kinds of learning experiences can be planned for his/her teaching and that there is no reason why teaching must be conducted in routine, unvarying ways?

**Educational media for learning**

Brown indicates that there are many types of aids and appliances that can be classified under educational media. They are listed as follows:

<table>
<thead>
<tr>
<th>Textbooks</th>
<th>Filmstrips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplementary books</td>
<td>Microfilms, microcards</td>
</tr>
<tr>
<td>Reference books, encyclopedias</td>
<td>Stereographs, maps, glob</td>
</tr>
<tr>
<td>Magazines, newspapers</td>
<td>Graphs, charts, diagrams</td>
</tr>
<tr>
<td>Documents, clippings</td>
<td>Posters</td>
</tr>
<tr>
<td>Duplicated materials</td>
<td>Cartoons</td>
</tr>
<tr>
<td>Programmed materials</td>
<td>Puppets</td>
</tr>
<tr>
<td>(self-instruction)</td>
<td>Models, mock-ups</td>
</tr>
<tr>
<td>Motion pictures</td>
<td>Collections, specimens</td>
</tr>
<tr>
<td>(films, video tapes, discs)</td>
<td>Flannel-board materials</td>
</tr>
<tr>
<td>Television programs</td>
<td>Magnetic-board materials</td>
</tr>
<tr>
<td>Radio programs</td>
<td>Chalk-board materials</td>
</tr>
<tr>
<td>Audio recordings (tapes &amp; discs)</td>
<td>Construction materials</td>
</tr>
<tr>
<td>Computer courseware</td>
<td>Drawing materials</td>
</tr>
<tr>
<td>Flat pictures</td>
<td>Display materials</td>
</tr>
<tr>
<td>Drawings and paintings</td>
<td>Flash cards, thesis</td>
</tr>
<tr>
<td>Slides and transparencies</td>
<td>Multimedia kit</td>
</tr>
</tbody>
</table>

He opines that learning can best be achieved by a variety of experiences in which a great variety of media are used. Introspection can also be made on how many of the items in the list are essentially verbal in nature? How many involve only elements of sound? Which of them are comprised chiefly of representational visual elements? Sound plus visual representations in
As described in this section, instruction in the classroom can be viewed in different dimensions in the light of the three domains of the taxonomy of educational objectives. Therefore, an indepth study of instructional strategies would be a good contribution to the field of education. Hence the study.

**Futuristic views of Educational Innovations**

Over the last few decades develop countries have confronted a growing set of interrelated problems relative to the utilisation of their education system to meet the perceived needs of national development. On the one hand there has been a rapidly rising social demand for the provision of educational services, while at the same time, the cost of providing such services has increased rapidly.

Faced by various problems, many nations have attempted to experiment with variations from traditional educational practices. With the advent of technological advances in communications media, many countries have turned to these innovations as a basic element in the design of new instructional strategies. Klees and Wells (1977) hoped that new technological approaches can contribute to advances in efficiency and productivity for the education sector, similar to those that have been attributed to technology improvements in other sectors of the economy. It has been the hope that innovations (like programmed learning, cooperative learning and multimedia) in instructional strategies can aid the education sector in increasing its productivity and accountability. This has been given in figure 2.5.
Mehta (1969) mentions that a country's economic and industrial growth is to a great extent determined by the pupils' motivation. Japan's outstanding economic advancement has been possible only through the people's motivation which, in turn, was aroused and stimulated by heavy investment in Education (Brameld, 1968).

Education as a Catalyst to Global Welfare

- **Methods**
- **Achievement**
- **Attitude**
- **Excellence**
- Better Teaching learning process
- Better educational Scenario
- Progress of the country
- Economy & Development of the country
- Welfare of the Global Village

Fig. 2.5
The effectiveness of education and its levels in terms of quantity and quality are determined by the extent to which the process of education itself employs the new findings of Science and Technology. Late Prime Minister Jawaharlal Nehru told a gathering of Scientists and Educators in New Delhi a little while before his death as follows:

“Some people seem to think education is not so important as putting up a factory. I may sacrifice any number of factories, but I will not sacrifice human beings and their education because it is the human being who sets up factories and produces the things we want.” Therefore good education is imperative for building a better tomorrow. In this context, the teaching method becomes a vital aspect in the process of education.

Education is a forecast. We are eagerly looking forward as to what will happen in the future so that we can decide how to prepare. The schools of future will be characterised by its focus on the individual. The teacher will be sensitive to variations among learners and to the educational needs of heterogeneous groups. The teacher’s role may consequently change. In a classroom setting, four dimensions are evident from the instructional point of view.

i) Instructional objectives
ii) Entering Behaviour
iii) Instructional Procedures
iv) Performance Assessment

In the above four aspects, the one which can make a sound impact on the overall classroom climate is the ‘Instructional procedures’. In the present educational scenario, the instructional objectives are well defined.
The student behaviour too is uncontaminated when the child really learns how to learn. It is the instructional procedure which helps the teacher to transmit the instructional objectives in an effective manner. Therefore, research in this area needs the most attention that it deserves. In this context, the studies presented in Chapter II highlight how important the instructional methods are towards the optimisation of learning experience. Hence the present study becomes a pertinent one in the field of education.

Having made a thorough review of related literature in this chapter, the methodology of the study is given in Chapter III.