REVIEW OF RELATED LITERATURE
CHAPTER II

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2.0.0 Introduction

Research in any field implies a step ahead in the exploration of the unknown. Unknown which is darkness. Any researcher to be able to take this step, should be adequately prepared for it. One such preparation is the gathering of knowledge of what has already been done in the given field. A step towards unknown can only be taken after the review of literature and researches done in that area. Any research without such a review is likely to be a building without any foundation.

Borg (1978) suggested, "The literature in any field forms the foundation upon which all future will be built. If we fail to build the foundation of knowledge provided by the review of literature, our work is likely to be shallow and naive and will often duplicate the work that has already been done by some one else."

The review of literature gives clear picture of the problem to be solved as being a pre-requisite to actual planning and conducting the study. The review of past investigations serves as a guide to the researcher as it avoids duplication in his field. The knowledge of what has
already been done in the area of investigation regarding the methods used for data collection and the results of their analysis, keeps a researcher systematic in his own endeavour. Thus the review of related literature is an indispensable step in any research.

In the present study, the investigator examined the effect of four classroom presentation modes on the achievement of secondary students in science. There are various researches conducted to evaluate the comparative effectiveness of different approaches of instructions for science subjects and also other disciplines. The studies were conducted both in India and abroad.

2.1.0 Studies in India and abroad

Veerappa (1958) examined the position of science teaching in India and reported that teachers use lecture-demonstration method for teaching science. Khusdil (1960) made a comparative study of the traditional and integrated methods in teaching of social studies. Mitra and Khanna (1963) found that CCTV was more effective as compared to direct observation in operation theatre. Desai (1966) suggested that programmed learning approach was more effective than the conventional teaching approach. Sharma (1968) also found that the achievement of the students taught through programmed method was higher as compared to
the group taught through conventional lecture method. The finding was also supported by SIE Gujarat (1970). Dewan (1966) reported the superiority of programmed television instruction over usual television instructions. Patel (1967) discovered that activity based method was superior to traditional method of teaching science. Kamalakanthan (1968) compared traditional method and problem solving method of teaching physics. Murthy (1968) who proved that the bilingual method is more effective than the direct method in teaching English to Telugu speaking students, was also supported by Nagarajun (1970). Shah (1969) examined the potentialities of auto-instructional programmes. Nagar (1971) discovered the effects of herbartian method and programmed learning of linear type were highly significant whereas Shah (1971) reported that the effectiveness of four response modes in programmed learning was not significant.

Shah (1973) examined the scope, utility and limitations of educational television and reported that the TV lessons were not planned well in advance and no change was observed in the quantity and quality of programmes over a long period. Sonar (1975) also made an investigation into the effectiveness of film strips in teaching of science. The investigator suggested that the methods of teaching sciences can be improved through the use of filmstrips. Sharma (1975) made an experimental study to evaluate functional
effectiveness of three methods - traditional method, lecture method and programmed instruction method. Subharwal (1978) revealed that bilingual method and programmed auto-learning based on the bilingual method were more effective instructional strategies for teaching of English as a second language for Hindi speaking students. Sharma (1978) found guided activity more effective than self-activity method regarding concept formation, development of scientific attitude, acquisition of scientific knowledge and training in scientific skills etc. Swarnamma (1978) discovered that most of the teachers adopt lecture-demonstration method for teaching biology in upper primary classes whereas Dev (1979) reported the use of lecture method by most of teachers for teaching mathematics in secondary schools of Nagaland. Gupta (1979) showed that analytico-synthetic method was significantly more effective than narration-explanation method for teaching geometry for standard IX but the two methods were equally effective for standard VIII. Jha (1979) suggested that activity based approach in teaching school science was more effective regarding acquisition of knowledge, application of scientific knowledge and development of scientific skills. Ankleshwaria (1980) studied the effectiveness of three instructional strategies viz programmed learning material + laboratory demonstration + discussion (s1), structured lectures with blackboard work + laboratory demonstration + library reference work (s2) and
Jeyachandran (1980) discovered that programmed filmstrip with teacher method was more effective than programmed film-strip without teacher method. Phutela (1980) revealed that many teachers did not consider STV programmes useful and reported the failure of STV programmes in sustaining pupils' motivation. Shahjhan (1980) found modular way of learning more effective than conventional method. Inamdar (1981) observed better performance of students when taught through programmed learning strategy than conventional technique. Sharma (1981) also reported that programmed instructions were more significantly effective than conventional method in terms of achievement and retention. But Kumar (1982) reported the effectiveness of multimedia method in comparison to programmed learning method or expository method. Davies (1982) examined the differential effects of three pairing modes in programmed learning viz - mixed ability pairing, pairing based on teacher choice and pairing based on student choice. Hopper (1982) concluded that all the three structured modular approaches- self learning, peer group learning and peer group learning with teacher intervention were effective in terms of cognitive achievement. Mohammed (1982) reported that tell and do method, guided discovery method and pure
discovery method were not significantly different in developing mathematical creativity. Ravindranath (1982) discovered multimedia instructional strategy to be effective in terms of achievement. Sastry (1982) studied the effectiveness of educational toys in teaching science at primary level. Yadav (1982) compared the effectiveness of lecture method and guided discovery method at different intellectual levels. Dhamija (1985) discovered that the achievement of students in geography was maximum when taught through Radio-vision approach, the achievement was maximum when taught through modular approach in civics and achievement was maximum in history when taught through conventional approach. Nair (1986) made an investigation into the relative effectiveness of inductively and deductively sequenced modes of teacher-centred presentation in physics at secondary school stage.

Chahl, Nirwal and Singh (1989) compared three modes of video presentation viz- straight talk mode, interview with scientist mode and panel discussion mode. They found that panel discussion mode was significant in gaining knowledge as compared to other modes. Shah and Kaushal (1988) studied the impact of television on students in terms of gain in knowledge, change in opinions regarding family relationships and household management etc. Bhattacharya and Ghosh (1989) conducted an experimental study to compare three strategies
of teaching viz - traditional herbartian method, advance organiser model and demonstration method. They reported advance organiser model was more meaningful. Atkins and Bhissett (1989) in their small scale exploratory study on pupils' use of interactive video, discovered that out of various learning activities, a high proportion was observed in the read/watch/listen category. Bhangoo and Kaur (1989) suggested that video film can be an effective medium of teaching, particularly useful for adult rural women. Ezeife (1989) identified currently used methods by physics teachers. Beishuizen and Putten (1990) evaluated a long TV series in terms of mental arithmetic, and Saadat and Afifi (1990) made an investigation into the effectiveness of closed circuit television instruction (CCTVI) and simultaneous instruction (SI).

Verappa (1958) examined the position of science education in India. He investigated that science education is introduced at the primary level, general science has replaced nature study, secondary schools generally include physics, chemistry and biology, popular way of teaching science at secondary stage is herbartian plan and the teacher generally adopt lecture-demonstration method for teaching science.

Khusdil (1960) compared the traditional and integrated
methods in teaching of social studies. Two groups of class VII students of two schools were selected. Two teachers were selected to teach the two experimental groups for one year. In integrated method the syllabi of history, geography and civics were integrated while the second teacher taught each subject separately. The findings of the study revealed that the group taught through integrated method performed better than the group taught through traditional method in respect of assimilation and acquisition of knowledge.

Mitra and Khanna (1963) observed that the use of CCTV was more effective than direct observation in operation theatre. Dewan (1966) showed that the television instructions in a programmed way are superior to the television instructions in usual way.

Desai (1966) made a study to analyse and adopt the technique of programming in the teaching of a language like Gujarati. Forty students of IX class in two sections of a secondary school in Ahmadabad were selected for the study. A programme was developed on 'types of compounds' for Gujarati language. This was compared with conventional method of teaching the same topic. The study made it clear that the programmed learning approach was more effective than the conventional teaching approach.

Sharma (1966) also made a comparative study of the
programmed method of teaching algebra and conventional classroom lecture method. Their effect on retention was studied. The findings of the study revealed that mean achievement of the experimental group which was taught through the programmed method was higher as compared to the control group which was taught through conventional method.

Sharma (1966) made a similar study to develop a lesson in geography on the programmed learning model. This model was compared with the conventional method. For the sample of the study, four sections of class VIII were selected from an urban and a rural school. Two sections, one each from urban and rural school were taught through conventional method. The results of the study showed that mean gain in the pre-test and post-test scores of the groups taught through programmed learning method was higher as compared to other group.

SIE (Gujarat) in 1970 conducted a study to find out the effectiveness of programmed learning method and conventional method of teaching. It was found that programmed learning method was better than conventional method, it saved time also. Patole (1967) investigated into the existing weakness of teaching science in rural primary schools. He discovered that activity based method of teaching science was superior to traditional method.
Kamalkanthan (1968) compared traditional method and problem solving method of teaching physics. The main objective of the study was to see the effectiveness of two methods in terms of gain in and retention of knowledge and abilities. Thirtytwo students of class X were selected as sample of the study. The students were divided into two groups of sixteen students each after the administration of pretest. Control group was taught through traditional method while the experimental group was taught through problem-solving method. The results showed that neither of the methods was significantly superior to the other. However considering objectives and end products of science teaching, the problem-solving method had positive favourable points as compared to the traditional method of teaching.

Murthy (1968) investigated the effectiveness of the direct method and bilingual method in teaching English to Telugu speaking students. The experimental and control groups were equated in respect of age, sex, home environment and prior knowledge of English. Control group was taught by direct method and the experimental group was taught by the bilingual method. The results of the study showed that the bilingual method is more effective than the direct method in developing the pupil's ability in oral reading, oral comprehension and expression.

Shah (1969) in his study "To develop Auto-
Instructional Programmes in Algebra for standard VIII and to find out their effectiveness in relation to different variables examined the potentialities of auto-instructional programmes. The sample for study comprised of two classes each of the four schools of Ahmadabad. The experimental group was allowed to learn by auto-instructional method, whereas control group was taught by conventional method. For auto-instructional programme whole syllabus of Algebra of VIII class was used. This was divided into seven units. A 'self test' was prepared which could give idea of the achievement to the learners as well as to the teacher. This 'self test' was given to the students at the end of each unit. The investigator found that the experimental group achieved higher scores as compared to the control group.

Nagrajan (1970) investigated the effectiveness of the direct method and bilingual method of teaching English to Hindi speaking pupils. Class VI of a Hindi medium school of Hyderabad was selected for the experiment. The control and experimental groups were taught for five months. The findings of the study revealed the superiority of bilingual method over the direct method of teaching.

Nagar (1971) investigated the effectiveness of two instructional treatments i.e. herbartian method and programmed learning of linear type. One objective of the
The study was to find out which of the two instructional methods yield better recall, retention and utilisation. The content learning, time and the educational level of the subjects were kept constant during the study. The study found that effects of treatments were highly significant at 0.01 level.

Shah (1971) in his study on the effectiveness of four response modes in programmed learning, compared the relative efficacies of (i) overt constructed response mode, (ii) overt prompt response mode, (iii) covert constructed response mode and (iv) covert prompt response mode. 188 students of VIII class of two English medium schools in the city of Baroda were selected as sample for the study. The sample was administered Shah's programme on addition and subtraction of directed numbers. Results of the study revealed that the effect of four treatments on retention scores was not significant in both the schools. Regarding consumption of time, covert response prompt mode seemed to be least time consuming and most effective in terms of immediate test scores.

Shah (1973) examined the scope, utility and limitations of Educational Television (ETV) in India regarding planning, production and prospects of its programmes. The following assumptions were made for the study - (i) ETV is helpful in promoting mass education keeping in view the population explosion in India; (ii) The
services of experts in the subjects like mathematics, english and science to the rural area school children can be provided which otherwise were not easily available; (iii) ETV is useful for teacher education; and (iv) the problem of illiteracy among adults can be solved with the help of ETV.

The study was completed in two phases - pilot study and actual survey. For pilot survey, seventeen schools, four education colleges and four coordinating agencies were selected. For actual survey, four nursery schools, thirty primary and middle schools, 113 higher secondary schools, four colleges of education and eleven AIR and TV personnel were taken. The data were collected with the help of observation, interview schedule and questionnaires. Interviews were taken of TV producers, programme executives, audience research officer, and school administrative set-up. The questionnaires were administered to school principals, subject teachers, students and parents. Main findings showed that the TV lessons were not planned well in advance. There was no change in the quality and quantity of programmes for a long period. The selection of TV teachers and the lesson supervisors and the work assigned to them was unsatisfactory. TV programmes were not duly evaluated. The service and maintenance of TV sets was not quick and efficient. It was also noted that educational personnel were not involved in the planning, production and utilisation of
school telecasts. There was no provision for TV courses in education colleges.

Sonar (1975) analysed the use of filmstrips in teaching of science. The investigator analytically studied the design, contents, utility and correlation of filmstrips and filmstrip projectors with primary science syllabus and text books. Twenty filmstrips on general science were prepared on the basis of prescribed textbooks. Evaluation forms were used for evaluating these filmstrips. These filmstrips were shown to students of classes V, VI and VII. Different filmstrip projectors were also examined. The researcher developed and improvised filmstrip projector operating on solar energy. The study revealed that very few filmstrips produced and available correlate with the prescribed syllabus and text books. Nearly all the topics in general science can be effectively taught through filmstrips. If produced in large quantities, their cost of production is low. The methods of teaching sciences can be improved with the help of filmstrips resulting in better standard of science education at primary school level.

Sharma (1975) undertook an experimental study to evaluate the functional effectiveness of three methods - traditional method, lecture method and programmed instruction method of teaching Sanskrit grammar separately to high school classes. A sample of 122 students was
selected from standard IX from a high school in Meerut district. 3x3 factorial design was followed as the students were divided into three sub groups of high, average and low achievement (on the basis of prior-examination marks) and three methods of teaching. The duration of the experiment was three months. A criterion test was administered at pre-test stage and post-test stage to collect the data. The study revealed that programmed instructions method was most effective of the three methods of teaching Sanskrit grammar. The three different achievement levels responded differently to the three methods; the high achievers taught through programmed instructions method attained higher than low achievers taught through traditional method. The attainment of high achievers was higher than that of low and average achievers when taught by the traditional method; the average achievers taught through programmed instruction method performed significantly higher than high, average and low achievers taught through the lecture method.

Subharwal (1978) assessed the relative efficacy of the four different treatments of teaching English as a second language (TESL) viz - the bilingual method, the audio-lingual method, the grammar-translation method and programmed auto learning method. The study also aimed at finding out whether higher or lower achievement in language-1, namely Hindi, helped or hindered achievement in language-
2 namely English. The sample for the study comprised of all the students of Grade VII of four higher secondary schools of Jaipur. The entire sample was administered L-1 and L-2 achievement tests. The sample was divided into nine factorial groups. Each of the experimental school was randomly assigned one of the four experimental treatments. The results of the study revealed that the bilingual method and programmed auto learning based on the bilingual method were more effective instructional strategies for the teaching of English as a second language for the Hindi speaking students.

Sharma (1978) analysed the existing position of teaching natural sciences at the primary level in central schools and effectiveness of different methods of teaching science at primary school level. To locate the existing position of teaching the natural science, survey method was adopted. Forty five science teachers of eleven central schools at primary level in the state of Punjab were administered a questionnaire consisting of 106 items. For comparing the effectiveness of different methods self-activity method and guided activity method, ninety students of class III were selected as sample. These students were divided into three matched groups of equal size. These three groups were taught three units of natural science selected from the curriculum. The experimental treatment was given
for about six months. Analysis of covariance was applied to pre-test and post-data. The findings of the study revealed that most of the teachers used traditional methods for teaching natural sciences. Few teachers adopted activity oriented teaching at this level. Most of the teachers gave their preferences to activity oriented teaching of natural science. Guided activity was found more effective than self-activity regarding concept formation, development of scientific attitude, acquisition of scientific knowledge, training in scientific skills and development of scientific attitude.

Swarnamma (1978) made an enquiry into the teaching of biology in the upper primary schools of Kerala. The sample was selected from three classes each from standards VI and VII of twelve schools of Trivandrum district. 500 students of standard VII of some selected schools were administered an achievement test at the end of academic year. The findings of the study revealed that most of the teachers adopted lecture-demonstration method for teaching biology in the upper primary classes.

Adinarayan (1979) in his study 'A teaching strategy for developing appropriate skills required in students for conducting scientific investigations', determined the advantages and effectiveness of learning through the
packages by individuals and groups. One hundred students of standard VII were divided into two equivalent groups. The study revealed that the performance of the experimental group taught through learning packages at the demonstration phase was significantly better than that of the control group taught by the conventional method.

Dev (1979) made a critical study of the methods of teaching mathematics in secondary schools of Nagaland. To evaluate the teaching methods in mathematics, twenty-one classroom teaching activities were conceptualised. A questionnaire, structured interview, observation, inventories like Pupil Attitude Inventory, Mathematics Teaching Competence Scale, Minnesota Teacher Attitude Inventory and Headmaster's rating scale for teacher behaviour were employed for data collection. Twenty schools (eight from urban area and twelve from rural areas) from three districts Kohima, Mokochung and Tuensang of Nagaland were selected for study. Overall 1,877 pupils from class III to VI and fourty-nine teachers constituted the final sample. The findings showed that lecture method was more used by teachers. The teachers had a negative attitude towards reflective type questioning. The teachers were poor in questioning skill mainly because they were weak in subject matter. Textbook contents as such were used by 61 percent teachers.
Gupta (1979) evaluated the effectiveness of methods of teaching geometry in high school of Aligarh. The researcher investigated the overall relative effectiveness of analytico-synthetic (A-S) method and traditional (narration-explanation N-E) method for the students of standard VIII and IX. Bi-group rotational design was employed in actual classroom conditions. The investigator himself conducted the experiment, teaching two periods daily to one of the two equated sections of each of the two classes for about 8 months. Standard VIII with thirtytwo students in each section were selected for the purpose of the study. Six achievement tests were standardised in geometry. The results of the investigation were: A-S method was significantly more effective than N-E method on achievement in geometry for standard IX but the two methods were found equally effective for standard VIII.

Jha (1979) designed a study for the experimental comparison of different methods of teaching high school biology. The sample of the study consisted of sixty students of standard X of Bankipur Government Girls' High School, Patna. These sixty students were divided into three groups, at random. The first was called as control group, the second group was called as demonstration group and the third group was called as activity group. The study revealed that activity based approach in teaching school science was more
effective regarding acquisition of knowledge, application of scientific knowledge and development of scientific skill.

Ankleshwaria (1980) investigated into the relative effectiveness of three instructional strategies viz - programmed learning material + laboratory demonstration + discussion called as strategy S1; structured lectures with blackboard work + library reference work called as strategy S2; and taped commentary with charts and worksheets + laboratory demonstration + discussion called as strategy S3. Another objective of the study was to find out any difference in the effective use of the three instructional strategies on the achievement of instructional objectives by the students of three levels of intelligence. Latin Square design and randomised group design was used. The findings of the study pointed out no significant difference between strategies S1 and S3 as well strategies S2 and S3. When the effectiveness on one unit of proteins was studied, a significant difference was observed between strategy S1 and strategy S2. Also strategy S2 was more effective as the students of high intelligence group and other two strategies were insignificant regarding the level of intelligence.

Jeyachandran (1980) studied the efficacy of programmed filmstrips as a method of teaching history in the secondary schools. The performance of the students was noted
in terms of immediate recall and delayed retention in the case of four objectives viz - knowledge, understanding, application and skill. The sample for the study comprised of 450 boys and 315 girls from nine schools of Madras city. The population was divided into three groups. These groups were taught through three different methods viz teacher with programmed filmstrip, programmed filmstrip without teacher and the conventional method. Four lessons were developed on the topics 'Buddhism' and 'Jainism'. Data were collected by administering the achievement test at pre-test and post-test stage. Major findings of the study indicated that learning was better through PLM in terms of retention. Programmed filmstrip with teacher method was more effective than programmed filmstrip without teacher method. The achievement of different objectives viz. knowledge, understanding, application and skill was maximum with the programmed filmstrip with teacher method followed by programmed filmstrip without teacher in decreasing order and least with the conventional method.

Phutela (1980) studied the utilisation and comprehensibility of school television (STV) programmes in Delhi. The investigation aimed at studying the factors responsible for underutilisation of the programmes, to study the teachers' attitude towards the school telecasts, to find out the preferences of teachers regarding the subjects for
teaching through television and to study the level of comprehension of the STV programmes on the part of the students of different classes. The sample for the study was selected from the middle, high and higher secondary schools of Delhi. A questionnaire was prepared based on content factors, motivation factors, presentation factors and viewing conditions. To assess the attitude of teachers towards STV programmes, a 4-point attitude scale was also employed. Comprehension tests were administered to the students at pre-test stage (before the telecast) and at the post-test stage (after the telecast). The outcomes of the study revealed that STV programmes were not found useful by many teachers because they did not differ from classroom teaching and these programmes failed to sustain pupil's motivation. About 38 percent schools in the sample possessing TV sets were utilising STV programmes. Most of the teachers agreed that teachers also learn from the programmes.

Sahajahan (1980) conducted an experimental study on teaching science through modules. The main objectives of the study were to design and develop modules for teaching science in standards VI and VII and to study the effectiveness of modules as an instructional method with respect to the conventional method. Matched group design was employed on the classes from a school of Dacca City in
Bangladesh. The experiment was conducted for one and a half month. Achievement test, Module evaluation checklist and attitude scale for studying attitude of students towards modules were used to collect the data for study. The findings were: the modular way of learning was found to be more effective than the conventional method in case of some modules and majority of the students responded positively and possessed a favourable attitude towards modular instructions. Their attitude was found to be stable during the period of experimental treatment.

Inamdar (1981) investigated the effectiveness of programmed learning strategy in the subject of mathematics for standard VII. The material was developed and validated for the topic 'Simple Interest'. This material was tried on thirty students of standard VII. The sample comprised of 108 boys and 100 girls both in the experimental and control groups. The performance of the groups was studied in relation to some personality correlates e.g. general ability, reasoning ability and motivation towards school. The results of the study revealed that students performed significantly better when taught through programmed learning strategy than conventional technique.

Kumar (1982) made an experimental study of the relative effectiveness of three methods of instruction - exposition method, programmed learning method and multimedia
method in science education. 3x2 factorial design was employed as there were three methods of teaching and two levels of intelligence. The sample for the study comprised of 180 students of classes IX and X of two intercolleges, divided into three groups of sixty students each. One group was taught through expository method, another group through programmed learning method and the third group was taught through multimedia method. Criterion test was administered both at pre-test stage and post-test stage. The results of the study revealed that multimedia method was more effective in comparison to programmed learning method or expository method. The programmed learning method was found to be more effective than the expository method. Retention in learning was higher when taught through multimedia method as compared to other two methods and retention in learning by the programmed learning group and expository group was equal.

Sharma (1981) in his study made a comparison of effect of programmed instruction method and conventional classroom method on the outcomes of learning mathematics. The sample comprised of 189 students of class IX in two groups. The students were matched on the basis of age, socio-economic status and locality of habitat. The experimental group was taught through a linear programme on Set Theory. Control group was taught through the conventional method of teaching. The investigator found that the method of
programmed instructions was more effective method than conventional method regarding not only achievement but also retention.

Davies (1982) studied the differential effects of the three pairing modes in programmed learning, namely - mixed ability pairing, pairing based on teacher choice and pairing based on student choice on the performance of underachievers in mathematics. The sample comprised of 1092 students of standard IX of ten schools selected at random, nine from urban area of Madras city and one from semi-urban area of Arkonam town. An achievement test in mathematics, questionnaire on 'Interest' in mathematics, participation in extra-curricular activities and academic self-concept, a general intelligence test, study habits inventory, personality test, socio-economic status scale and an adjustment inventory were the tools used for collection of data. The underachievers in mathematics were located by using predicted scores in mathematics based on intelligence test scores and actual scores on the achievement test in mathematics. The students, whose actual achievement in mathematics fell short of their predicted scores by at least two stanines, were called as underachievers. Main findings of the study indicated that underachievers had 78 percent individual gain and these underachievers in 'teacher choice' and 'mixed ability' pairs gained significantly in the post
Hopper (1982) studied the use of modular approach for teaching biology. He selected three modular approaches involving self learning, peer group learning and peer group learning with teacher intervention. Three higher secondary schools of Madras were selected for experiment. Students of standard XI of these schools in three groups of fifty three, fifty and fifty three were taken. Rotation group design was employed. The experiment was conducted for twelve weeks involving learner-engaged time of sixty six periods. The tools used for the investigation were Cognitive Entry Behaviour Test and Module Reaction Opinionaire developed by the investigator. Also, Frymier's Junior Index of Motivation, and Cattell and Cattell General Intelligence Test were used to obtain data for achievement of the objectives of study. The results of the experimental study revealed that all the three structured modular approaches of teaching were effective regarding cognitive achievement in morphology, physiology and ecology. However, the self-learning approach was more effective than the other two modular approaches.

Mohammad Miyan (1982) examined the effectiveness of methods of teaching mathematics with the main objective for developing mathematical creativity. The sample comprised of
the students of three sections of class IX of a Kendriya Vidyalaya, New Delhi. The three methods of teaching mathematics used were the tell-and-do method, guided-discovery method and pure discovery method. Topics selected were simultaneous linear equations and inequation, logarithms and logarithmic tables, percentage, profit and loss and discount. A test of Mathematical creativity, developed by the investigator, was used at pre-test stage and post-test stage. The duration of experimental treatment was about six weeks. The interpretation of results revealed that none of the three methods of teaching was found to be significantly different in developing mathematical creativity.

Ravindranath (1982) undertook a study to develop a duly validated multimedia instructional strategy for teaching biology at standard VIII. The multimedia strategy had twelve instructional components viz. introduction by the teacher, programmed learning material, lecture, team teaching, inquiry technique, pupil activities with teacher demonstrations, audio-visual presentations, narration of biographical sketches of scientists, summary, criterion test and feedback, exercises and assignments. An experiment was conducted on ninety students of standard VIII for final validation of multimedia strategy. Two matched groups were formed from the sample. Pre-test and post-test design was
employed. Effectiveness of multimedia strategy and traditional method of teaching was assessed in terms of achievement. Also relative effectiveness of two types of programmed learning material (PLM) i.e. inductive PLM and deductive PLM was also assessed on few selected units on biology. The results indicated that multimedia instructional strategy was found to be effective in terms of achievement. The performance of the students of experimental group was better as compared to control group on comprehensive test and also on annual examination conducted by the school authorities. The students of experimental group also showed better development of scientific attitude.

Yadav (1982) studied the effectiveness of lecture and guided discovery methods at different intellectual levels and in terms of hierarchy of learning in cognitive domain. Seventy eight students from almost all strata of society (i.e. rural/urban, ranging in income from Rs. 250 to Rs. 2500 PM) were selected randomly. Control group was taught through traditional lecture method and experimental group was taught through the guided discovery method. The results of the study showed that a significant difference between the mean achievement scores obtained in the post-test by both the groups existed. However no significant difference was observed in the mean achievement scores of the superior, the high average, the average, the low average
and the border line defective subjects of control group on pretest and post test while significant differences were observed in the mean achievement scores of the superior, the high average, the average, the low average and the border line defective subjects of the experimental group on pretest and post test.

Dhamija (1985) made an investigation to see the comparative effectiveness of three approaches of instructions - conventional, radio-vision and modular approach on the achievement of students in social studies. 3x3x3 factorial (Nesting-cum-crossing) design was followed. For the study, sample students of three schools formed three parallel groups for the three approaches. The design was factorial because the achievement and retention of concepts were investigated through two more factors i.e. intelligence and test occasions. Thus three factors were involved, namely- approaches of teaching (conventional, radio vision and modular), intelligence (high, middle and low), and test occasion (pretest, post test I and post test II). Geography, History and Civics subjects were taught. The study revealed that the students achieved the highest knowledge achievement scores in geography when taught through radio vision approach, the achievement of the students was the highest in knowledge achievement scores in civics when taught through modular approach, and the students achieved the highest
achievement scores in history when taught through conventional approach.

Nair (1986) designed a study with the view to investigate the relative effectiveness of inductively and deductively sequenced modes of teacher-centred presentation in secondary school Physics. The effect of these modes on the achievement regarding acquiring information, developing understanding and developing the ability to apply the knowledge in new situations was investigated. Fifty matched pairs of standard IX were selected from three schools. The pairs were matched on the basis of age, sex, intelligence and socio-economic status. The Kerala University Verbal Group Test of Intelligence and Kerala University Scale for measurement of Socio-Economic Status were the standardized tools used for study. An achievement test based on unit - current electricity was applied to the population of sample. The experimental group and the control group were formed on the basis of matched pairs. The experimental group was taught by the inductive method and the control group was taught through the deductive method. The investigator taught both the groups himself to keep teacher and time variables constant during the study. The results of the study revealed that there was no significant difference between the experimental and control group achievement in physics regarding acquiring information, developing understanding.
and developing the ability to apply the knowledge in new situations except in two cases, out of 24 subgroups considered. Therefore the researcher concluded that by and large the two methods i.e. inductive and deductive methods were equally effective in terms of achievement in physics.

Chahl, Nirwal and Singh (1988) conducted a study to compare the three modes of video presentation viz. straight talk, interview with scientist and panel discussion on gain in knowledge at immediate exposure in respect of age groups, education groups and age-education groups of farmers. 'Before-After' type of experimental design was followed. The sample for the study constituted six villages which were divided into three groups of two villages each. The farmers of these villages were divided into twelve groups of a 3x4 research design consisting of three age levels (i.e. A1 having 15-30 years, A2 having 31-45 years and A3 having above 45 years) and four education levels (i.e. E1 illiterate, E2 primary education, E3 high school and E4 above high school-college stage). In total 108 farmers were taken having selected 36 farmers for each treatment i.e. 12 age education groups of respondents x31 respondents from each age-education group. The experimental treatment was based on the topic "Haemorrhagic Septicaemic Treatment and Control" related to disease of buffalos and cattle. This topic was carried on through three modes of video
presentation viz. straight talk by scientist (T1), interview with scientist (T2) and panel discussion among scientists, farmers and extension worker (T3). Personal interview was taken by the researcher before and after the video presentation mode to collect the data. Achievement test was also administered to the sample both before and immediate after the interview for getting information about the gain in knowledge due to the treatments of the study. Analysis of variance was applied to interpret the data. The results of the study revealed that panel discussion mode has helped more in gaining knowledge as compared to interview with scientist mode and straight talk mode. There was no significant difference between panel discussion mode and interview mode on the gain in knowledge with regard to young farmers having passed college education and old farmers with primary or high school education.

Shah and Kaushal (1988) undertook an investigation to study the impact of television on students in terms of gain in knowledge; change in opinions regarding family relationships and household management; change in the amount of time spent by them on household and outside activities. The sample of the study constituted 75 third year students (session 1985) of the Institute of Home Economics, Delhi. Tools used were - a check list about film oriented programmes, educational programmes, serials, documentaries,
advertisements and other entertainment programmes like Youth Forum, play etc. On the basis of these programmes, a final questionnaire having two sections was constructed. The first section of final questionnaire collected information about socio-economic status, personality dimension, academic performance and adaptation to modernity through the use of Kuppuswamy's revised SES scale (1981), V.S. Shantamani and A. Hafeez's revised personality scale; previous year's final result for academic performance and Alex Inkles (1974) short form adapted to Indian conditions for modernity scale. The second section of items was about social and legal problems (cause and ill effects), personality development and household management, change in opinions regarding family relationships and household management, and change in the amount of time spent on household and outside activities. The results of the study revealed that majority of the respondents were modern, high achievers and from high socio-economic status. The students gained more knowledge about personality development than social and legal problems and household management. The impact of television viewing on the respondents in terms of change in their opinions was not so significant. It was, however, observed that television viewing had more impact on introverts, average achievers and conservative students than extroverts, high achievers and modern students in terms of change in opinion and gain in knowledge. The study concluded that the
television programmes should be prepared in such a way that they may suit to all categories of people like children, youth, adults, oldmen and women and at the same time people should explore the potentialities of television as a versatile medium giving educational programmes and mass entertainment programmes.

Bhattacharya and Ghosh (1989) in their experimental study compared three strategies of teaching- Traditional Herbartian Method (THM), Advanced Organiser Model (AOM) and Demonstration Method (DM) in biological sciences. Parallel group design was employed. Three homogeneous groups - Group A, Group B and Group C were formed on the basis of intelligence test scores. Each group comprised of 12 students of class XI of Chakdah Purbachal Vidyapith, Chakdah, Nadia. The three groups were taught through different teaching strategies. Formative (C.S.) test and Summative (C.R.) test were developed by the investigator and used for the collection of data. Three lesson plans each were developed on THM, AOM and DM. Group A was taught through THM, Group B through DM and Group C was taught through AOM. The results of the study revealed that though the entry levels were more or less same in all the three groups but the formative test scores of three groups differed due to the experimental treatment. AOM strategy proved potentially meaningful as compared to THM and DM.
Same was the result with summative test scores. This study pointed out that students taught through AOM have more understanding of scientific concepts, as compared to other methods.

Atkins and Blissett (1989) conducted a small-scale exploratory study on pupil use of interactive video. Six groups of pupils with four pupils in each group were selected as sample of the study. Each group comprised of two boys and two girls. Three tasks were given to each group based on the concept of probability. The three tasks were: to crack a secret three digit code which was randomly generated by the computer to get through a mysterious door, to run a small business and make decisions about distribution of 'swap cards', and thirdly to study a bus route using a surrogate travel facility. The pupils who were shown videodisc, were withdrawn from normal maths lessons. One of the investigator was present at the time of showing the videodisc as a non-participant observer. The class teacher was not present. Video recording of the group was done each time during the use of videodisc. The first analysis of the tapes revealed six types of learning activities: discussion, read/watch/listen, decision entry, technical, dead time and off task. The findings of the study indicated a high proportion in the read/watch/listen category.
Bhangoo and Kaur (1989) studied the effectiveness of educational video films in Home Science subject for use with rural women. A survey of the needs of rural women regarding home and family life was made. About 500 adult rural women in the age group of 15-35 years were selected from ten villages of Ludhiana district, Punjab. The sample for the study included almost equal percentage of married and unmarried women, 94 percent married women were housewives, about 80 percent were in 15 to 25 age group, most of the women were having education between primary and high school stage, some were completely illiterate and the range of family income varied from Rs. 300-1000 per month. On the basis of pooled judgement of home and family life, two topics were finally selected which were of great need and interest to women. The topics were 'removal of stains from clothes' (87 percent responses) and 'decoration of house' (86 percent responses). The video films on these two topics were prepared after consultation with subject experts of the concerned disciplines in Home Science. Two villages out of ten (which were included in need survey) were selected at random. Pre-test Post-test group design was employed. An objective type test consisting of 50 items for each film was administered immediately before and after the video films show. The results of the study indicated that the achievement of respondents was greater for film I (use of
colour for home decoration) than for film II (removal of stains) for post-test II. A great variation of scores was also observed for scores of film I than film II but the values of paired 't' (P 0.01) indicated that both the films were significantly effective for gaining knowledge. The study suggested that video film can be an effective medium of teaching, particularly useful for adult rural women.

Ezeife (1989) made an experimental study on a theory-backed technique of physics teaching. To identify the currently used methods by physics teachers, a preliminary survey was made of randomly selected 212 physics teachers in 150 schools in Akwa Ibom and Cross River States of Nigeria. This survey identified that lecture method and lecture-with-demonstration method were the most prevalent methods. These two methods were compared with the Three Phase technique (innovative approach). The lecture method was designated A; lecture-with-demonstration method (enriched approach) was designated B and three phase technique as C. The sample for the study was taken out from six randomly selected schools (three boys' and three girls' schools) in the Uyo educational zone of Akwa Ibom State. From these schools IV secondary school physics students including 75 boys and 75 girls were selected. These subjects were randomly assigned to three equivalent groups G1, G2 and G3. Each group was randomly assigned a teaching method. These three groups
received instructions based on a uniform course material for 15 weeks. The testing conditions and timings of instructions for all groups were kept identical. After the experimental treatment, post-test was administered to all the three groups. A 3x2 factorial design was followed and the double classification analysis of variance was employed as the statistical measure. The results of the study revealed that there were significant differences among the performance of the groups. It could be concluded from the results that method of teaching was decisively a significant factor in the performance of physics students which is reflected by their scores of physics achievement test.

Beishuizen and Putten (1990) carried out an evaluative study into a long TV series on mental arithmetic for the upper grades of the primary school. For study I, eight schools were selected for data collection. The patterns of usage for TV series in 1986/87 in the classroom were observed. The programmes on video were used in an active way by half of the teachers with interactive stops and discussions (ACTIVE), while other half of the teachers used the programmes in a passive way (PASSIVE). Eight comparable schools were selected. Out of which, four schools made a combined use of video with interactive teaching and other four schools used video recording only. But for reasons like delays of lessons, less interactive use because
of shortage of time etc, six schools were kept for statistical analysis. The programme duration was twenty five minutes but in ACTIVE condition—the time was about twice (on the average 45 minutes). This was because of intermitted interactions as there were about 10-15 video stops per lesson. Criterion tests developed by the investigators themselves were applied to the subjects. The criterion tests were taken (in parallel forms) three times, during the evaluation period—before (T1), half way (T2) and after (T3) the twelve weekly TV quizzer. The results of the study revealed an increase in mental computations and a decrease in written calculations as compared to control schools. When the conditions of using video tape were compared, in the ACTIVE-condition learning gains increased more strongly from the very start of the TV quizzes. The investigators made a follow up study II in 1987/88 with the improved TV series "Rekenwerk". Two former ACTIVE schools were ready to participate again and one new control school was selected. The number of subjects was 80. The TV series was reduced to 8 programmes—this time the criterion test was applied only two times—one before (T1) and second 3 months later (T2) after the TV quizzes. In this study II, the lessons were not observed. A short record of the number and types of interactions and total time of each lesson was kept by teachers. The results of study II again indicated that the TV series has resulted in substantial learning effects
and learning is higher than at the control No-TV schools.

Saadat and Afifi (1990) evaluated the effectiveness of closed-circuit television instruction (CCTVI) and simultaneous instruction (SI) for teaching of English. A 3-version questionnaire was administered to both male and female students to elicit feedback. The questionnaire covered the following six areas concerning the use of CCTV as a tool of instruction: lesson presentations and method(s) of teaching, student-instructor interaction, student achievement, evaluation of students' work, the role of female teaching assistants (TAs) in supervising CCTV classes, and instructors' and students' attitudes towards CCTV and SI. There were 35 questions for instructors' version, 14 for male students' version and 24 for females'. The questions were of two types. Type A included those questions in which the subjects were asked to respond on a 3-point rating scale of 'agree', 'disagree' or 'uncertain'. Type B included those questions where the subjects were to choose one or more responses from 3 or 4 possibilities. Each version consisted of an open-ended attitude question as final question. Further two main areas of foreign language education i.e. English 252 (introduction to literature) and English 204 (English Grammar 1) were analysed. These courses were offered to male and female students in two different semesters. In one semester the course
instructions were given through SI i.e. course taught by male instructors to male students in an origination studio and simultaneously to female students in a class studio via CCTV. Then in other semester the courses were taught through DI i.e. directly by male instructors to male students and female instructor to female students in conventional classrooms. The achievement of male students in DI courses were compared with their achievements in SI courses. And achievement of female students in DI courses were compared with their achievement in CCTV courses. The calculations gave the differences between the means of grades that male students and female students achieved in each course. On the basis of questionnaire results and course grades analysis, the study suggested that DI is the best alternative to overcome the limitations of CCTVI and SI, particularly in language courses. This was also supported by McKeachie (1978) that TV instruction in composition courses proved to be 'significantly inferior to conventional instruction'.

After having reviewed the related literature, it was substantially found that there have been various studies on effectiveness of lecture mode, demonstration mode, programmed learning approach, inductive and deductive modes, expository method, problem solving method, auto-instructional programmes, laboratory method, analytic
synthetic approach, narration-explanation approach, tell-and-do method, guided discovery method and interactive video mode etc. but no effort has been made in the direction of studying the comparative effect of demonstration mode, video mode and students' learning through self-experimentation on the achievement of secondary students in science. Hence the present study is an attempt in this direction.

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