Chapter III

Review of Related Literature

Introduction
Perception on media and modern instructional technology
Performance and individualized learning materials
Performance and computer assisted instruction
Performance and instructional modules
Performance and multimedia package
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3.0 Introduction

Survey of related literature provided valuable help in the development of knowledge in research work. It helps the investigator to gain insight into various aspects of the problem area, that is in formulating a framework for the study, developing the methodology, constructing the tool for data collection and planning the analysis of data.

Since the problem under investigation is the "use of self-learning materials: perception and performance of student teachers at secondary level" the investigator tried to collect studies related to perception on media and instructional technology and performance regarding the use of modern instructional strategies. After going through the profuse literature, the investigator has selected only those which are relevant for the present study. The related literature thus examined has been classified into five sections as follows.
3.1 STUDIES RELATED TO PERCEPTION ON MEDIA AND MODERN INSTRUCTIONAL TECHNOLOGY.

3.2 STUDIES RELATED TO PERFORMANCE AND INDIVIDUALIZED LEARNING MATERIALS.

3.3 STUDIES RELATED TO PERFORMANCE AND COMPUTER ASSISTED INSTRUCTION.

3.4 STUDIES RELATED TO PERFORMANCE AND INSTRUCTIONAL MODULES.

3.5 STUDIES RELATED TO PERFORMANCE AND MULTIMEDIA PACKAGE.

The related literature examined under each section is mentioned below.

3.1 STUDIES RELATED TO PERCEPTION ON MEDIA AND MODERN INSTRUCTIONAL TECHNOLOGY

Miles (1996) conducted a study on “Multimedia Technology in the classroom: Perception of Community College Academic Leaders.” The purpose of this study was to examine and compare the perception of deans of instruction and chairpersons employed by Alabama’s Community Colleges on issues related to multimedia technology in the classroom. A survey instrument which was designed by the researcher was mailed to all the deans of instruction
and division chairpersons employed by Alabama’s twenty Community Colleges. The respondents identified their present employment position and responded to a series of Likert type items concerning their attitude regarding the use of multimedia in classroom. The findings revealed that

1. A significant number of community college leaders believe that the use of multimedia technology is within the mission of the college, and the students taught through the use of multimedia technology will perform at higher more than teachers who do not use computers at home.

2. There is more use of traditional media and that multimedia are still used more for lower level activities.

3. The teachers feel that they are not prepared for using modern instructional strategies and educational technology in their college training and their districts are not providing meaningful ongoing in-service support for teachers.

4. Very little advanced technology are available for teachers to use.

Bennet (1996) conducted a study on the level of use of advanced technology and the level of teacher training to integrate technology in grades 3, 5 and 7 in two countries of a metropolitan area. Questionnaires were sent to all teachers in grades 3, 5 and 7 in two countries of a metropolitan area which gathered information on the type and availability of all technology in the schools, show that technology is used and the
level of training that they have received to maximize the use of technology.

The study revealed that,

1. The teachers with ten years of experience or less more likely to integrate the use of technology in their classroom than teachers who have taught more than ten years.

2. Media such as OHP and film projectors are used at a significantly greater level than advanced technology such as video and computers.

3. Teachers who use their computers at home on a regular basis integrate computer use in their classroom.

Khemchandani and Beena (1998) attempted to find out the use of technological devices by academic counsellors at IGNOU study centres of Ahmedabad, Gujarat. The objectives of the study were,

1. To study the extent of use of devices for educational technology by the academic counsellors who were participating in teaching at the Ahmedabad study centres of IGNOU and

2. To study the futuristic awareness about educational technology among the academic counsellors teaching at study centres of IGNOU.
The study found that,

1. Simple technological devices like OHP, VCR and TV were frequently used by the academic counsellors, but nearly 30% of the respondents had never used even these devices. Nearly 50% of the respondents had never used TVs and VCRs in classroom teaching.

2. More than 90% of the respondents had never used CCTV and Videotext in the classroom. None of the academic counsellors had used a slide projector, computer or any other devices for open learning materials.

3. Academic counsellors in general were not satisfied regarding the use of technological devices.

Malic (2001) conducted a study on the topic “Computers in Indian Schools” and reported that our perception of the role of new information technology in education is ephemeral. They are shaped and reshaped by the social and psychological impact of technology. The shifting of school computing in different countries including India speaks of these changes.

Morris and Huang (1994) studied on “Perception of College Students towards computers as delivery media and a self-instructional environment.” The setting for this case study was an undergraduate self-instructional course which incorporated teaching strategies such as individualized instruction, active learner participation, mastery learning and peer
Review of Related Literature

tutoring. Perception of the college students towards computers as delivery media and the self-instructional environment were investigated. The study was conducted as computers were introduced into this non traditional course within a traditional college context. Data were gathered by means of survey, interview and document review of the semester and evaluation. Both qualitative and quantitative data were used to report student perceptions towards the application of soft and hard technologies. The study found that the college students preferred using text books and computers. They perceived that using text book would be learning more, that supports the assumption of one’s preference enhancing achievement gain through media. Self-instructional course was rated as promoting more efficiently the course features under study.

3.2 STUDIES RELATED TO PERFORMANCE AND INDIVIDUALIZED LEARNING MATERIALS

Anderson and Batts (1980) made attempts to evaluate the effects of individualized instruction experimentally. A series of worksheets were developed by them from the elementary science study unit and used to teach 3 classes of the sixth grade students at west lake High School, Texas. Two classes covered the same materials using a lecture discussion technique instead of worksheets. Student’s gains are evaluated through pre-test and post-tests.

The results of the study can be summarized with this statement that the students reacted much more strongly to the subject matter than to the style
in which it was presented. There were no differences in either achievement or attitude between the students who studied with self-paced worksheets and students who were taught by more conventional class discussion techniques.

Blaney (1977) conducted a field survey to assess systematically the effect of interdependent learning groups as opposed to traditional teacher taught competitive classes, upon the attitude and interpersonal liking of elementary school students, the interdependent learning group manifested higher self-esteem than controls.

Cartin and Sund (1970) in a brief review of research programme have summarized the advantage of individualized instruction. They are,

1. Pupils achieve well in individualized classes.
2. Gifted pupils achieve to a greater extent than with traditional group instruction.
3. Discipline problems are likely to decrease.
4. Children prefer the individualized over the traditional approach.

Fernald and Duhaun (1975) found that,

1. Individualized instruction is more effective to high achieving students.
2. Individualized instruction promote improved study behaviour which is maintained later under conventional instructional situations.
3. Students in individualized instructions are more accurate in evaluating their mastery of course material than students receiving conventional instructions.

Gupta (1973) developed a self-instructional programme in basic science pattern of English for the graduate students. The study evolved three samples selected from local colleges of Meerut. The first tryout was administered on a sample of six undergraduate students and then on four small groups of five students each. Subsequent to this, a group consisting of eightyone students was selected for empirical try out and another group consisting of seventy students was taken for final field testing. The programme was subjected to individual, group and field try out and was amended and modified.

Hyman (1973) introduced a concept of individualizing instruction which leads teachers to stress responsibility and independence on the part of each student. Teaching involves the development of individual student’s intelligence, reasoning powers and search for truth. The emphasis is significantly on who the pupil is, what he can become and how he interacts with people and objects around him. This concept considers the student as a unique individual. Hyman introduced five proposals to individualize teaching. They are,

1. Consciously create a positive environment centering on mutual trust and respect.
2. Emphasise for the evaluation of students.

3. Relate classroom activities whenever practical to the students life in and out of schools.

4. Vary the teaching methods used.

5. Ask a variety of questions which seeks to develop critical and creative thinking and elicit further questions from students.

Jernsted (1976) conducted a study which revealed that students under individualized instructions reviewed their course more favourably than students under traditional instructions. Individualized instruction produced superior performance only when the unit completion activities of the individualized section were similar to the behaviours on the examination instruments.

King and Szabo (1972) conducted an individualized physics programme at the Boys Town Areas Senior High School to increase Physics enrolment, achievement and interest by shifting the instructional strategies towards increasing degrees of individualization. After the first year of the project, Physics enrolment increased 20 percent. It appears that the project is effective in increasing enrolment, stimulating interest in teaching physics and providing a new degree of individualization for the students of Physics at Boys town.
Review of Related Literature

Martin (1975) has tried many techniques of individualization. Quasitracking, contract learning, programmed learning and so on. Each attempt was aimed at getting every individual student to learn Science and each attempt was frustratingly meaningful. He came to the conclusion that each student studies what is meaningful to him and in a manner best suited to him as a unique individual person.

Nayar and Subha (1999) conducted a study on “Self-learning Instructional Materials in the Teaching of Biology: an Experimental Study.” The study found that,

1. The experimental group which used self-instructional materials recorded a high achievement score than the control group, indicating that the learning strategy of using self-learning instructional material was effective in improving the level of achievement.

2. Self-learning instructional material was found effective in enhancing the performance of students as the experimental group scored significantly higher in their post-test scores than that of the pre-test scores.

Rabindradas (1984) found that self-instructional material on health education developed by him helped the school students to achieve better learning than the conventional classroom teaching.

Shavelson and Munger (1970) conducted a study to find out the effectiveness of an individualized instruction. 96 students participated in this
study to test the relative effectiveness of an individualized secondary science instruction system against a traditional self-contained classroom approach. The students were randomly distributed into four groups. Students in groups A₁ and A₂ (N=24) received instruction via a teacher through slide mediated presentation. While group B (N=24) received the same instruction via a self-paced presentation. A no treatment control group A₃ (N = 24) constituted the fourth group.

The post test demonstrated that there is no significant difference between groups A₁, A₂ and A₃. The group B performed significantly better on both achievement and time than group A₁ and A₂.

3.3. STUDIES RELATED TO PERFORMANCE AND COMPUTER ASSISTED INSTRUCTION.

Relatively a few studies are measuring the effects of computer assisted instruction and most of the studies concentrate on cognitive effects of pupils as an outcome of computer application. Some studies showed significant gains in divergent and reflective thinking. Recent studies suggested that several aspects of modern tutorial software particularly the fantasy element could make the subject matter intrinsically more interesting and hence increase learning (Balasubramanian and Rengaraj 2002).

Aldamash (1995) compared the influence of animated visuals with static visuals upon college student’s understanding of organic reaction
mechanism in chemistry. The result indicated that students using animated visuals did significantly better than control group with respect to knowledge of organic reaction mechanisms. The study revealed that,

1. The developed computer aided instructional material is quite effective.

2. The student’s reaction towards computer aided instructional material is positive.

Almulla (1995) studied the influence of computer animation on leaning. This study was designed to test the hypothesis that the animated visual graphics would help subjects to achieve more learning than non-animated visual graphics. It was found that the dynamic group had higher achievement scores than the static group.

Ayoubi (1988) studied effectiveness of microcomputer assisted instruction on achievement in High School Chemistry. The findings revealed that students spending half their classroom instructional time studying chemistry from microcomputer programme reached the same level of achievement as students receiving instruction from teachers. High computer time users have made better achievement gains than low time users. The significant difference between high and low ability students was erased if the low ability students spent more time on the computer than the high ability students.

Balanchard (1989) conducted a study on the effect of computer managed instruction on student achievement in electronics technology at the
College level. Significant differences in student attitudes towards the subject matter, the instructor and the college were not supported by the study.

Balasubramanian and Meera (2002) conducted a study on Relative Effectiveness of Different Modes of Computer - Based Instruction in Teaching Biology. The objectives of the study are as follows;

1. To develop syllabus based Computer based Instructional Packages in different modes viz. Tutorial, Drill and Practice and simulation for the selected content areas.

2. To find out whether there is any significant difference among the different modes of computer assisted instructional strategy viz. Tutorial, Drill and Practice and simulation in realizing the instructional objectives in Biology at Standard XI.

The findings were,

1. CAI in drill and practice mode is more effective when compared to the CAI in tutorial mode.

2. CAI in simulation mode is more effective when compared to CAI in tutorial mode.

3. CAI in drill and practice mode is more effective when compared to the CAI in simulation mode.
Balasubramanian and Rangarag (2002) conducted a study on “Development and Validation of Syllabus oriented computer based Instructional Package in teaching Physics. The objectives of the study were,

1. To develop syllabus based Computer Software Packages in teaching Physics at Higher Secondary level.

2. To validate the developed Computer Software Packages from technical and pedagogical point of view by experts, educationists and practicing teachers.

The developed computer software packages have proved quite effective.

Bhardwag (1990) carried out a study on “Development of Computer Aided Instructional Material on Microbes for Standard VIII.” The objectives of the study were,

1. To study the effectiveness of CAI for teaching microbes in terms of achievement of students.

2. To study the reactions of students towards CAI material.

The study found that,

1. The developed computer instructional material has proved quite effective.

2. The students reactions towards computer aided instructional material is positive.
Christeena (1992) developed and demonstrated a system for assessing the normative or expected progress of pupils, who are engaged in learning through CAI. The student’s rate of progress was collected in computer generated ‘snapshots’ or training of the time elapsed between screens in a computer activity.

Dudley et al. (1974) conducted a study to test the effectiveness of CAL for teaching Economics. The objectives of the study was that the use of CAL would result in higher student achievement in understanding Economics. The study revealed 20 percent increase in mean score of those students using Computer Assisted Learning material. The study also revealed that the computer is a valuable teaching aid in economics.

Jayamani (1991) developed a computer assisted instruction package in Physics for Class XII students. The experimental group received CAI and after experiment it was found that experimental group performed better on the post-test than the control group.

Joseph (1982) attempted to determine if the achievement of the high school Physics students can be improved through the use of micro computers as part of their daily instruction. The study revealed that direct teach, lecture / discussion can be reduced by as much as 50 percent by adopting micro computer student instructions, with significant effect on student achievement.

Kulik et al. (1982) studied the effectiveness of CAI in students from sixth to twelfth grade. The study revealed that sixth to twelfth graders in CAI
groups consistently scored better in measures of achievement retention and speed in a variety of subject areas. The study revealed that although CAI is effective for college education, it is even more effective for pupils in the sixth through twelfth graders.

Maya (1999) conducted a study to test the effectiveness of computer assisted lesson in Biology for Standard VIII. The main objectives of the study were,

1. To study the comparative effectiveness of CAI mode approach and, lecture method based on the topic ‘tissue system’ in terms of achievement in realising certain outcome.

2. To assess the comparative effectiveness of computer assisted instruction and lecture method in realising certain selected educational outcomes.

The major findings of the study were,

1. Computer assisted instruction is significantly superior to lecture method in terms of achievement and in realising educational outcomes categorised under cognitive, affective, psychomotor and social aspects.

2. The study also reveals that the existing curricular factors are suitable to implement the CAI at secondary schools.

Mahapatra (1991) carried out a study on “Development and effectiveness of Computer aided instruction in terms of achievement and
abstract reasoning of class IX students. The study found that, the CAI proved quite effective and the student’s reaction towards CAI material were positive.

McDonald (1994) found out the effects of studying in the co-operative learning groups on the performance of high and low achievers. It was found that both high and low achievers in the co-operative treatment increased achievement on programme controlled and learner controlled computer lessons. The learner controlled co-operative learning group made more options while checking their concept learning, and spent more time interacting with the learner controlled individual computer based tutorial than the learner controlled individual learning group.

Mohan (1999) conducted a study to find out the effectiveness of computer assisted learning, self-study approach and teacher centered approach in the learning of Chemistry in standard IX. The main objectives of the study were,

1. To find out student’s performance when computer assisted lessons, modules and conventional methods are used for learning.

2. To compare the effectiveness of CAL and modules with conventional methods of teaching.

The major findings of the study were:

1. CAI is more effective than modular learning method and conventional method.
2. CAI is more effective than modular learning method for the high and average intelligence group of students.

Moslephour (1999) compared student achievement resulting from learning electronics concepts by computer simulation versus traditional laboratory instruction. The purpose of this study was to enhance the students knowledge about passive devices of electronic circuity. Two groups of college students participated in this study over an academic year. The research indicate that computer simulation should be applied to complex topics.

Prabhakar (1989) carried out a study on “Development of Software for computer aided instruction and its comparison with traditional method for teaching ‘semiconductors’ at plus II level”.

The study was conducted with the following objectives.

1. To study the effectiveness of computer aided instructional material in terms of achievement and reaction towards computer aided instructional material.

2. To study the influence of treatment on achievement.

3. To compare the reaction towards computer aided instructional material of class XI students with that of class XII students by considering post test as covariate.
The findings of the study are;

1. The CAI was found to be effective in terms of achievement of students belonging to class XI and class XII.

2. The CAI was found to be effective in terms of reaction of students belonging to class XI and class XII.

3. The CAI material was found to be significantly superior to the traditional method: but no significant difference was observed when groups were matched with respect to intelligence.

Radwan (1988) studied the effectiveness of a computer assisted intelligent tutoring system model developed to improve specific learning skills of special need students. The study revealed that utilization of intelligent tutoring model would significantly improve the learning skills of the students in maths and developed a positive attitude towards computers and schools as a whole.

Ryan (1991) conducted a study to compare the classroom instruction and computer based instruction for Navy training course. A total of 79 subjects were selected. 37 subjects were taken as control group and 42 subjects completed the course using a computer based instructional delivery method, formed the experimental group. The study concluded that computer based instruction was effective.
Rose (1992) prepared the software for CAI. This was used along with and without a trainer support system for teaching underachievers. The result was positive. However CAI used in conjunction with the trainer support system proved to be beneficial to the underachievers.

Whipple (1991) conducted a study to find out the relationship between computers used in instruction and increased academic achievement. The study revealed that, more than five hours of training of teachers in the use of computers in instruction is a significant indication of increased academic achievement of elementary school students.

Several studies have been conducted on the effectiveness of computer assisted instructional materials. These include those of Campbell, Peek Horn and Leigh (1987), Lakshmi (2000), Jayakrishnan (2000), Purushothaman and Stella (1991), Rangaraj (1995), Roy (1994), Saravanan (1992), Sethuraman (1998), Shanmugha Sundaran & Stella (1990), Bennet (1986), Mahajan (1994), Palaniappan (1990), Sivarajthriru (1986), Abraham (1984), Dalton (1986), Mohan (1987) and Nachimuthu (1989). In all these studies it was observed that the developed computer assisted instructional material is effective in terms of student's achievement on criterion test.

3.4 STUDIES RELATED TO PERFORMANCE AND INSTRUCTIONAL MODULES

Anderson (1975) made an experimental study on the effects of a Modular Biology course on attitudes towards Biology. His findings were the following.
1. There is significant difference in attitude between students who completed the modular course of study and the students who had the traditional lecture classes.

2. Students who had the modular course showed higher attitudinal gain scores than the students in the control group.

3. There is a significant difference in achievement between the experimental group and the control group with the experimental group scoring higher.

On the basis of the findings, he concluded that some evidences for the effectiveness of the modular course of study in changing students attitude as well as improving achievement were found.

Broome (1980) prepared a module on “Spherical Trignometry” to provide fresh challenging and unique topic for high school students and to enrich the mathematical background of the students by exposure to a non Euclidean Geometry, the geometry of a sphere. This module is designed for use at the high school level as a 4-8 hour topic.

Donald and Mervin (1973) conducted a study to investigate the effectiveness of a series of self instructional modules (SIMS) for training secondary level social studies teacher trainees to develop and ask higher level questions. The study showed that self-instructional module is more superior to conventional methods for developing concepts and skills.
Halyard (1977) did an experimental study to determine empirically if the use of biology module which made available optional learning materials resulted in greater achievement than the use of a module containing the same content with no optional learning materials. Two modules and all division were developed by the investigator. One was a control module and the other, the experimental one. The module were used for one week. The pretest and post-test were given. The major findings of the study were the following.

1. No achievement difference were detected to any cognitive level between the groups.

2. Most of the students using experimental module did not use the opinion available to them.

3. Modules that lacked optional learning materials were equally as effective as module that made optional learning material available.

Heller and Date (1976) conducted a study to compare the effectiveness of instruction using a “Learning Module Approach” with that of instruction using a “Traditional Lecture Discussion” in an undergraduate course entitled “Psychology of Exceptional Child”. The result of the study showed that module programme results in significant gain for students.

Hurst (1974) designed flexible competency based learning module to change elementary teacher trainee’s knowledge, skills and attitudes towards enquiry teaching. The effectiveness of the module was compared in three
classroom settings, individualized group and control group. The modules are used as syllabus for the course and as a guide for classroom and out of class activities. The control group received no instructions related to enquiry teaching. The pre-test, post-test treatment as control group design was used to analyse the results. The statistical tests employed found that there were.

1. Significant gains in the number of objectives achieved after instructions of social studies in the treatment group.

2. Social studies in the two treatment groups have significant gain in attitudes towards enquiry.

3. In both individualized and group settings, teaching learning modules may serve as means to creative instruction in teacher education in the future.

Justus (1981) conducted a study on “Preparation and Comparison of Supervised Study Module with Test Book Approach in the Teaching of Biology in High Schools of Kerala State”.

The objectives of the study were,

1. To determine the effectiveness of supervised study module in teaching biology.

2. To compare the effectiveness of supervised study module over text book approach in the teaching of biology under the categories of objectives; knowledge understanding, application and skill.
The results of the study were;

1. Supervised study module is more effective than text book approach in the teaching of biology in high schools.

2. Supervised study module is more effective than text book approach in the teaching of biology under the categories of objectives; knowledge, understanding, application and skill.

Pultroak (1975) worked on the development and field testing of a lab module for instruction in Vascular Plant Taxonomy. A self paced lab module in Vascular Plant Taxonomy was developed to aid undergraduate biology students in understanding both traditional and contemporary activities of the plant taxonomist. Results showed that the general biology students preferred the modular method of instruction than the traditional type.

Rae (1985) conducted a study on “The Development and Evaluation of a Self Instruction Learning Module” for associates of science degree nursing students. The purpose of the study was to determine the effects of self instruction module and the study employed a non-equivalent control group design with random assignment of intact groups. The sample for this study consisted of 78 associate degree nursing students. Submitting the scores to an analysis of covariance at the 0.05 significant level revealed that the experimental group performed better on the post-cognitive examination than those taught the exchange system for real planning in a regular medical-surgical nursing class.
Sasscar (1974) made a study of the development, implementation and evaluation of a modularized, student centered general biology curriculum at the college level. In the curricular design, major units of study were isolated and broken into units. In each one of them, a basic module was planned to be exercised by all students. In that module a concept was introduced with a minimum of information. Following that there was a set of option modules from which the student could select one to several to complete the unit, the minimum path being the basic module and one option module.

The experimental group used the modules whereas the control group used a standard method. The findings of the study were the following.

1. Highly significant differences in test scores means favoured the modular students in the option area.

2. T-test comparisons of attitudes towards Science showed significant differences between modular students and control students, favouring modular students.

3.5 STUDIES RELATED TO PERFORMANCE AND MULTIMEDIA PACKAGE.

Varma (1998) conducted a study to examine the effectiveness of instructional media in modifying the cognitive and effective behaviour in prevention and control of Acquired Immuno Deficiency Syndrome (AIDS). The objectives of the study were
1. To find out whether the effect of instructional media viz. video, audio, slides, posters and lecture method are effective in modifying the cognitive and affective behaviour among undergraduate students with regard to AIDS epidemic.

2. To find out whether there is any significant difference between lecture method and different instructional media.

The findings of the study were,

1. Instructional media was effective in achieving the instructional objectives in AIDS awareness programmes.

2. Different instructional media viz. video, audio, slides and lecture method were not effective in changing the attitude towards AIDS epidemic except posters as an instructional media.

Krishnan (1983) developed a multimedia package for teaching a course on Audio-Visual Education, including programmed slides, programmed print material, non-projected visual aids, self-instructional material with manuals for practical exercises, self-evaluating unit tests, feedback etc. and found it quite effective.

Menon (1984) used a multimedia approach for post-graduate students and found it as satisfactory.
McDonald (1996) conducted a study on “The impact of Multimedia Instruction upon student attitude and achievement and relationship with learning styles”. The purpose of this study was to determine the impact of multimedia instruction upon student’s achievement and attitude and the relationship with Kolb’s Learning styles.

The findings of the study included

1. The use of multimedia instruction had a positive impact upon student attitude.

2. Approximately 73% of the students believed multimedia added to the overall value of the class.

3. There was significant difference for achievement by class between sophomore and freshman students and between senior and freshman students.

4. There was no statistically significant difference for achievement by preferred learning style.

5. A negative correlation was found between final exam score, final course grade and student attitude toward multimedia instruction and achievement.

Rajaswaminathan (1998) conducted a study on “Impact of Multimedia Package on the Teaching of Commerce with performance to select variables.”
Review of Related Literature

The study found that the use of multimedia package was more effective than conventional method of teaching.

Vardhini (1983) developed and tried out "A Multimedia Instructional Strategy for teaching science at secondary level". The findings of the study was that visual projections with teacher explanation and those with taped commentary were equally effective in terms of achievement. On the basis of her efforts and experience she concluded that for achievement of different instructional objectives, systematically validated multimedia strategy can be implemented at school level without having to spend too much money or time.