CHAPTER - II

REVIEW OF THE RELATED LITERATURE
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"The literature in any field forms the foundation upon which all future will be built, if we fail to build the foundations of knowledge provided by the review of literature, our work is likely to be shallow and naive and will often duplicate someone else." - Anonymous

Every research begins from where the previous researchers have left it, and goes forward. Therefore, it is essential to acquaint oneself with what has already been thought, expressed and done about the problem under investigation. This is done by reviewing books, journals, newspapers, records, documents, thesis, indexes, abstracts, dissertation and other sources of information directly and indirectly connected with the problem under investigation.

The study of related literature implies locating, reading and evaluating reports of research as well as reports of casual observations and opinions that are related to the individuals planned research project.

Review of related literature defines the limits of researcher's fields. It helps to delimit and define his problem. It also avoids unfruitful and useless problem areas. One can also avoid unintentional duplication of well-established findings. Those areas can be selected in which positive findings are likely to result and the endeavors can add to body of knowledge in a meaningful way. Reviews also help in designing research.

The review of related literature and research studies have been divided into sections as the main variables under study, that is:

2.1 Role of Educational Technology

2.2 Development of Multimedia Learning Package

2.3 Effectiveness of Multimedia Learning Package

2.4 Validation of Multimedia Learning package.

2.1 ROLE OF EDUCATIONAL TECHNOLOGY

Report of the working Group on Educational Technology, Govt. of India, Ministry of Education (1978) laid Foundation stone with the setting up of Educational Technology Cells in the states which later established in the form of Central Institute of Educational Technology in the National Council of...
Educational Research and Training in 1984, symbolizing the development of Educational Technology at the national level. CIET ventured into the field of multimedia. An NCERT study report on ET (Educational Technology by Shukla 1984) stated "Research needs to be an integral part of all programmes of ET. Adoption of some technologies such as satellite communication and computers is also very necessary. Their utilization and gains needs to be studied. Technology, by itself, cannot solve the problems of extension and needed improvement in education. Human variables are extremely important, both in the use of technical devices and as affected by its use. A continued watchful effort can work help in improvement in the field of education".

The project known as 'Classroom 2000 plus' study (1993) which was started by the Central Institute of Educational Technology (CIET), NCERT emphasizes that interaction is the pre-requisite for achieving higher cognitive levels. The study report was based on a variety of interactive techniques and technologies such as group interaction, interactive media, multimedia and teleconferencing etc.

NUEPA (2004) Document described EDUSAT project as a new revolution in education, offering an opportunity of constructing multi channel learning system, comprising virtual classroom through video retrieval conferencing and computer communication, digital storage, retrieval facilities and internet based and supported learning.

Goel (2006) in his paper presented at the National seminar on Educational Technology, 2006 abstracted 54 studies on media and Computer Assisted Learning Material which were conducted in India from 1998 onwards. The studies establish the effectiveness of computer Assisted Learning Material (CALM) on a variety of subjects such as Hindi, English, Physics, Chemistry and Math & Review of the studies reveals that there is a significant gain through interaction with the CALM and CAI. It can be inferred through almost all those studies that computer is an effective medium for instruction. The studies also establish the fact that the interaction mode has been found to be more effective than the talk back mode.
Srivastva (2006) in her research study concluded that there was difference in availability of all usage of computers in different Govt. Schools i.e Sarvodayas and RPVVs were found to be better in terms of infrastructure than the other Govt. Schools, but there is overall lack of syllabus based multimedia package to supplement classroom teaching. The study reveals that there is immense need of Information Technology based pre-service and in-service training for teachers. Though students and teachers both are happy using computers but there is lack of motivation.

2.2 DEVELOPMENT OF MULTIMEDIA LEARNING PACKAGE

Rabindernath (1984) conducted an experimental study on the development of multimedia instructional strategy for teaching science at secondary school level. The main objective of the investigation was to develop a duly validated multimedia instructional strategy for teaching the course in biology at standard VIII. The experimental group performed better than the control group on comprehensive test.


This package provides.

Guidelines for the development of original audio cassette and radio scripts, self learning modules and audio- visual aids for use in training teacher in population education guidelines for using a prototype multimedia package prepared by the UN Educational Scientific and Cultural Organization of Regional office for Education in Asia and Pacific. The guidelines for the development of original media were formulated in the process of designing the media package. Scripts should be of about 15 minutes long and contain: (i)A brief introductory statement; (ii)A body which develops the topic; (iii) Closing remarks which summarize the content. Self learning modules should be highly specific, and clearly written and logically organized.

Bilan (1995) prepared computer-based multimedia in learning and instruction both for pre schools and Division I Students. In this program by selecting a language on the opening screen, the learners are sent to the screen that
let them choose show Me (I want to learn new numbers) Or how many (a self Test).

**Garnett, Hackling and Olliver (1997)** designed an interactive multimedia package to improve beginning students' understanding of chemical equations. In this three discrete modules that introduce students to chemical equations and develop skills in balancing equations and their interpretation. The materials are designed for use in direct teaching, tutorial or self instructional modes.

**Pande and Mohan Lal (1998)** prepared multimedia in Education: Rock Art. The program on rock art has been prepared keeping in view all factors in mind. This is the first version for children of the age group between 10-14 yrs. It is prepared keeping in view of the age group as well as the level of the learning of the user. Of course, this programme is not the replacement of the teacher it can’t be a substitute for a site visit and no amount of description by words can explain rock art.

**Koh (1999)** conducted a study to investigate students learning of geometry using the computer. Secondary school students developed geometric thought during instruction was investigated using dynamic software. The use of active visualization with dynamic software facilitated the movement, form the symbol to signal and then to applicatory characters.

**US Department of Education (1999)** gives its report which contains several white papers focusing specially on multimedia. In general these papers indicate that the research reports supports the use of multimedia in IT assisted Project Based Learning (PBL). In such PBL, the content and assessment tends to be authentic and students learn both the subject area being studied and also how to create multimedia documents.

**Angelides and Agius (2002)** created an interactive multimedia learning environment for VLSI built with cosmos. The system was built with COSMOS which is a modeling scheme that the authors developed for enabling the semantic content of multimedia to be used with in interaction system.
Community Aid and Sponsorship (CASP. 2002-04) Developed 30 interactive multimedia packages in different schools subjects. The packages were developed in Mathematics, Sc., History, Geography and English for standard V to VII. The packages were developed in Marathi. These 30 packages are truly interactive and are widely used in Maharashtra.

Grcovic, Brigg and Priscilla (2003) conducted a study on Interactive Multimedia package. This package is a self learning resource which enables exploration at any level, rate, order and degree of detail. It consists of nine modules each containing approximately 20 hrs. of core educational activities. The program is an appropriate self learning resource for both discipline based and problem based courses where it can be used to provide an entire anatomy learning program.

Gopalan, Reddy and Madhavi (2004) developed a multimedia package in distance: Instructional setting for gender in Agriculture. With the introduction of computers in the educational and instructional setting design development and utilization of multimedia package is assumed important. The format required for instructional settings vary from situation to situation and careful planning in terms of story-board, lesson planning and software application. Gender being a complex subject matter with divergent view points is selected for developing multimedia package for instructional purpose.

Tutsui (2004) investigates multimedia as a means to enhance feedback; he identified the requirement for an effective delayed feedback tool and then introduced this software to demonstrate the potential of multimedia as a technology for use in delayed feedback.

Vijashri (2004) developed interactive Multimedia CD's. Print materials are accompanied by interactive multimedia CDs that provide training to users in how to use Multimedia. For this interactive CD's are developed. These are mainly for the primary schools teachers and for the rural people.

World Conference on Educational Multimedia Hypermedia and Telecommunication (2004) was organized for the implementation of multimedia in developing a learning package to introduce basic mathematical knowledge for
preschool children within the age of 4-6 yrs. The objective is to develop multimedia learning package. The combination of multimedia elements such as graphics, audio, animation and text in one digital environment could create an interesting and interactive learning environment

**Bombay Community Trust (BCT, 2005-2006)**, studied the effectiveness of interactive multimedia package for the students of standard V of VII from the lower socio-economic strata. The study was conducted in 10 schools and 30 interactive multimedia packages in 5 schools subjects in Mathematics, Science, History, Geography and English.

**Garg and Panda (2005)** conducted a study on interactive multimedia for Distance and online learning of IGNOU, through the offer of its multiple media based and online programmes and the experiences gained on the diverse and innovative practices in the open distance learning system in the country. Distance Education Council has taken and considered view to strengthen and enrich various existing and upcoming programmes with interactive multimedia content. (Combining print, audio, video, Graphics and animation)

In Jan. 2005 three weeks national workshop in which 18 faculty members from IGNOU, SOUS, and CCIS participated. The Workshop as a preliminary step in the development of interactive multimedia contents, focused on scripting and instructional design.

**Sidhu, Selvantanahan, (2005)** developed a TAPS interactive multimedia package to solve engineering dynamics problems. A multimedia problem solving prototype package is developed to help students solve an engineering problem in a step – by step approach. A learning architecture model for developing an interactive technology assisted-problem solving (TAPS) package for visualizing engineering concepts has been developed.

**Pallister (2006)** implemented a multimedia e–portfolio to support learning achievement and progression. Walsingham School and community college set in rural area in U.K has developed and successfully trailed a video rich multimedia. The approach is unique in that students are taught how to use multimedia.
Sidhu and Ramesh (2006), in his study on Multimedia Learning package: Design issues and implementation. Problem found, three prototype of the engineering learning packages based on Windows platform were developed and tested. These learning packages were developed to supplement weak and slow learners. Animations were used to illustrate the conversation process in order to promote better recall.

2.3 EFFECTIVENESS OF MULTIMEDIA LEARNING PACKAGE

Kumar (1981) conducted an experimental study on relative effectiveness of three methods of instruction – exposition method, programmed learning method and multimedia method in science education. The findings of the investigation were: i) the multimedia method was more effective than either the programmed learning method or the expository method; ii) Retention in learning by the multimedia method was higher than by the other two methods.

Passi and Pal (1982) conducted a study on the preparation of a multimedia instructional module for developing the skill of observing classroom behavior through flander's interaction analysis category systems (FIACS). Results reveal that the experimental group studying through instructional material obtained a significantly higher mean score on the criterion test than the control group.

Krishan (1983) designed a multimedia package for teaching a course on Audio visual education. The findings of the study were as follows: - i) 98% of the trainees obtained more than 80% of the marks on the final post-test; ii) The mean gain in the total scores for all the modules was found to be significant at .01 level; and iii) The feasibility of the multimedia package was established in terms of cost involved in reproduction of the various resource materials and the time scheduling in an actual institutional set up.

Kozma and Johnston (1991) Conceptualized seven ways of using multimedia. The study stated that Instructional Technology can support learning by enabling active engagement in construction of knowledge, making available real-world situations, providing representations in multiple modalities (e.g. 3-D, auditory, graphic, text) drilling students on basic concepts to reach mastery,
facilitating collaborative activity among students, seeing interconnections among concepts through hypertext, learning to use the tools of scholarship. All these seven ways point towards increasing role of multimedia in classroom.

**Pal (1991)** studied the effectiveness of computer assisted instruction on mathematics achievement of students at the piagetian, concrete and formal stages of development. Results showed that computer assisted instructions are more effective than the traditional approach at concrete stages of development.

**Singh, Ahluwalia and Verma (1991)** studied the effectiveness of Computer assisted instruction (CAI) and conventional method of instruction on the teaching of mathematics, the result shown that the students who used the computer scored significantly higher than those taught mathematics through the conventional method.

A study reported by **Educational Telecast (1994)** revealed that there is a direct relationship between viewing of educational telecasts and the children performance. They do significantly better in mathematics, environmental sciences and language skill with audio visual representation, if teachers too get involved with them. The study was sponsored by NCERT which indicates that teacher view educational programmes along with the students, but they don't find time to discuss the programmes with the children. The study suggests that the success of educational telecasts depends mainly on the quality of programmes analyzing the children to enjoy and the quality of support services such as electricity, and television, computer sets with a good reception which together adds to the viewing experience. The study recommends the use of multimedia programmes on a vast scale so that the children and teachers could appreciate the potential role that the multimedia can play and lighten their work load. Television computer programmes should use one or more animals, cartoons, children, music and dance etc. to have a greater impact on the teaching learning process.

**Purushothamen, Sand Stella (1994)** reported effectiveness of teacher controlled interactive video for group instruction. – Experiments in Education. The major findings were as follows (i) the teacher controlled I.V. technique resulted in better academic achievement compared to other techniques. (ii) The
teacher's role when combined with I.V. lessons was able to produce the most desired effect on learning.

Sivin kachela and Bialo (1994) reviewed 133 research reviews and reported on original research project from 1990-1994 and the process was then repeated by Sivin Kachela, Bialo and Langford (1997) who reviewed 219 educational technology research reviews and reports from 1990-1997. Through this process they concluded that introducing technology into the classroom results in more student centered learning, cooperative learning and teacher/ student interaction.

Najjar L. G. (1996) reported a study on multimedia information and learning. The results show that the learning advantage of computer based multimedia instruction over traditional classroom lecture may be due to the increased interactivity of multimedia instruction rather than the multimedia itself.

Tosbes, Chia, Bucat and Sleet (1996) described the vischem project visualizing chemistry with multimedia. The IMM package was designed to improve students understanding of the particulate molecular basis of chemical reactions and their ability to balance and interpret chemical equations. The provision of concrete representations of unobservable entities and processes and the use of an interactive approach with associate feedback should facilitate student's achievement of scientifically acceptable conceptions of chemical equations and their application.

Harper & Hedberg (1997), Sims (1998); Shinde (2003) stated that the major feature of well designed multimedia courseware is user interactivity. They have shown that an interactive learning environment can generate effective instruction and learning. There is empirical evidence that multimedia can enhance the learning of at least certain kinds of information. A review by various researchers of studies that have investigated the effectiveness of multimedia instruction performed better in terms of test scores, compared to those who received instruction through traditional classroom lectures. Interactivity during learning has been noted by (Bosco 1986; Fletcher 1989; Leahey & Harris 1989; Najjar 1996) to have a strong enhancing influence on learning by improving
retention and the speed of learning. Novelty also has been associated with why multimedia may be effective for learning.

**Karandikar, C.M. (1997)** conducted a study on evolving a video instructional Package to teach balanced diet to the students of standard VII and Studying its effectiveness in terms of the student's achievement. The result shows that the students of experimental group who were exposed to video instructional package showed better performance than that of control group through traditional method of teaching.

**Nigo and Charles (1997)** reported the effectiveness of Instructor Controlled Interactive video (ICIV) as compared to conventional non interactive video and lecture method in modifying the cognitive behavior among farmers in Agriculture. The main findings of the study were: i) There was significant difference between the means of pre and post test scores; ii) It was found that the ICIV was more effective than LM in modifying the cognitive behavior; iii) ICIV was found to be more effective in its effectiveness in enhancing retention at all levels of cognition.

**Rangaraj, K.R. (1997)** in his research study on effectiveness of computer assisted instruction in teaching physics at higher secondary stage, investigated that there was significant difference between means of the scores of the pupils at all levels of cognition as measured by the retention test between lecture method and CAI as individualized instruction.

**Sandholtz et. al. (1997)** studied on "Multimedia project based learning' summarizes the research and provides strong evidence of the success of IT-assisted project based learning (PBL) in the classroom.

**Okol and Ferretti (1998)** described the benefits of using multimedia in Education showed that students composition representing ideas simultaneously through text and audio, video and sound increased the likelihood that student will acquire an understanding of complex information. It is a reasonable conjecture that using an even wider range of media will extend this effect.

**Mann, Shakesaft, Beckes and Kottamp (1999)** in a study of West Virginia researches examined the effect of the West Virginia Basic Skills.
Computer education program which had been emplace for ten years. In West Virginia and the researcher found that the Program had a powerfully positive effect especially in those schools that used it most intensively. They found significant gains in reading and writing maths and that the program was especially successful with low income and rural students as well as with girls.

Shallcross (1999) introduced an interactive multimedia learning environment for Chemical Engineering Education. It will require only a modest effort to adopt most of the material to the specific needs of the students who are not based on campus. By the use of email between the distant student and the academic these students will be able to study and learn the course material with only limited attendance on campus. These students many of whom will be engaged in full time employment will be able to regulate its own pace of study devoting as much or as little time to their studies to work as their commitments permit.

Iwanaga, M. (2000) conducted a research study on “The present and the future on multimedia- Japan's open learning”. Multimedia is one of the most powerful means of supporting thousands of potential learners who needed or wanted can acquire a higher education. It allows the great chance by virtue of its variety and versatility.

Thillaba and Pramilla (2000) studied the use of computer multimedia program in learning Trigonometry among High School students. It was found that there is no influence of computer based multimedia programme on the achievement in mathematics among high school students. It was also found that there is no significant change in their attitude after learning Trigonometry through computer based multimedia and text based self– study material.

Jain (2001) recruited a small group of students and clinicians to test out the usability of CAI. All subjects reported satisfaction with the programs and recommended the usage of CAI programmers as supplementary learning and teaching material.

Carr (2002) studied the effects of computer assisted instruction in elementary physical education that is the interaction related to an anatomy of
human body, the experimental design was 3 dimensional with domination of
gender, grade 3, 4, 5 method of instruction computer assisted and traditional and
length of knowledge recall. Result showed that participants who received CAI
displayed a greater immediate recall of knowledge than the participants who
received traditional instructions. The recall of knowledge after one day and after 6
weeks was comparable for both methods of instruction.

Youngberg (2002) studied the effects of incorporating technology in
mathematics education. This method allowed the students to discover
mathematics at their own pace.

Macaulay Michael (2003) explained the effects of multimedia on
learning in Third world children. The performance scores of two groups of 18
children were recorded before and after using either multimedia or no multimedia
to learn mathematics. The children that used multimedia scored significantly
higher than those who did not.

Bhuvneshwari (2004) studied the effectiveness of the computer assisted
evaluation package deployed in internet and intranet as measured by Tamil Nadu
professional course Entrance Examination. It was found that there was significant
difference among the different instructional strategies and there was a significant
difference in the performance of the students under the different instructional
strategies.

Sethuanadhavan (2004) conducted a research study on the preparation of
an instructional package for the Art of Healthy and productive living. Out of the
56 students selected for the study, 30 students showed increase in cheerfulness
and 29 students increase in their energy level.

Taj (2004) in his study described that enhancing the performance and self
confidence of slow learners through Activities and use of multimedia package. In
the pre test phase the experimental and the control group differed significantly in
their self confidence and performance in environmental science. The slow
learners improved significantly both in terms of their achievement and confidence
following the experimental program proving its effectiveness.
Bodemer, Ploetzner, Bruchmuller and Haeber (2005) studied the supporting learning with interactive multimedia through active integration of representation. They revealed that the active integration of static representations before processing dynamic visualizations resulted in better performance and can provide a basis for a more systematic and goal-oriented experimentation behavior during simulation-based discovery learning.

Subor and Hanrizer (2006) in his study on an evaluation of the effectiveness of interactive multimedia to enhance divergent-analytical thinking skills. The package was significant and enhanced the performance of experimental groups as compared to the control group for all the modules.

Vellaisamy (2007) reported the effectiveness of Multimedia Approach in teaching science at upper primary level. The findings were: i) The pupils of the experimental group achieved more than the pupils of the control group in science at upper primary level; ii) The pupils of the experimental group have improved than the pupils of the control group in their scientific attitude.

This is due to the favorable impact of the multimedia approach in the learning of the VIII standard pupils. The study demonstrated the effectiveness of learning science.

Anjali (2008) in her research study on integrating multimedia package at pre-service level showed the effectiveness of the multimedia package in learning the concept of management of chemistry laboratory and also helpful in developing the higher order skills and promoting collaborative activities.

Szu Hsin Lee (2008) attempts to measure the learning achievement of College students from two intact groups in an art class when a multimedia form of instruction was utilized in place of traditional instruction. Only the experimental group received digital content based instruction and three-dimensional visualization modules. A post test and pre test instrument was utilized for both the experimental and control group. A one-way ANOVA was used to determine significant differences between groups. The usage of the three-dimensional visualization module (the experimental group) produced a significant difference in student performance as compared to traditional instruction.
Yuva SLP (2008) Yuva Life Skills programme of Education, Department Delhi Administration is a classic example of a multimedia programme as a part of the joyful, interesting and meaningful learning. The programme aims at providing orientation training to the teachers of Municipal Corporation of Delhi and Education Department of Delhi Administration. This multimedia enriched programme has been successfully used to bring an improvement in the quality of education in Delhi schools. Its impact has clearly been seen on the CBSE results of Govt. Schools of Delhi.

Madan (2009) developed a Multimedia Teaching Program (MMTP) and study the effectiveness of multimedia teaching program for teaching of English. The result implies that the students who were taught English through multimedia teaching program showed significant improvement in their achievement than the student who received instruction through the traditional method.

Rai (2009) described the use of multimedia, not only brings creativity but encompasses all arenas of Education through text, graphics, moving images, sound and music with the help of computers. According to Rai, Multimedia is global term and involves presentation using multiple media, including computer based multimedia presentation. The integration of multimedia technology in the classroom can prove very effective both for students and teachers.

2.4 VALIDATION OF MULTIMEDIA LEARNING PACKAGE

Shah (1979) developed and tried a multimedia package on effective Questioning in the context of Microteaching were exposed on the treatment of the self instructional multi media package gives the following results: The findings of the study based on the package course evaluation questionnaire indicated that the package course was quite interesting for the participants The qualitative evaluation of the package led to the conclusion that the teachers were quite satisfied with the package course so far as its educational importance was concerned.

Daniel and Lock wood (1995) developed an instructional Multimedia program (called "Oz soils") at the University of New England and has been used by students of an introductory soil science unit as an additional learning aid since
1995. The programme was evaluated by means of student's questionnaires. The response to the program was very positive with students reporting it to be easy and enjoyable to use and believing it to be educationally effective. There was no difference in response pattern between female & male students. The evaluation results provide encouragement for further development of multimedia program to assist in teaching soil, sc. as well as other science

Kennedy, Petrovic and Keppell (1998) investigated the development of multimedia evaluation criteria and a program of evaluation for computer aided learning. These questionnaires corresponded to the criteria in the evaluation domains of instructional and conceptual design and interface and graphic design. A template questionnaire was developed for the final evaluation domain.

Hanley, George, Tanksale (2006-07) investigated how the research informed development model affects the pedagogical learning outcomes and design solutions of university students responsible for creating interactive advertising and news content for T.V. An interdisciplinary group of 3 professors and 31 undergraduates from advertising, computer science, Journalism graphics and telecommunications employed a research informed development process to create interactive design products and collect feedback from target users about the interactive advertising, news content and interface designs and functionally. students used the feedback from user focus groups to revise and improve the design work before each of three rounds of usability tests.

Callings (Information science and Engineering) reported the Implications of multimedia for university education. Multimedia is being used in education at the University of Canberra, for example CD ROM based multimedia software is used to demonstrate mathematical concepts via a portable computer in a lecture theatre; a multimedia package for teaching quantum physics to engineering students will be used. In the computer service center (CSC) and some faculties are engaged in the development of multimedia systems. In this the use of multimedia in teaching and learning and evaluation of multimedia software was done.
Rajgurer & Bhagwat (2006) developed a distance mode learning material to give handy education to tackle discrimination for social transformation and justice. Experts from various fields related to the development of the learning device did the rating to the tool on a five point scale. Veteran experts are working in the area of women's empowerment and gender quality, experienced professionals from fields of film make and development of educational documentations, qualified and professional having computer expertise with vast experience in the field of educational and developmental media authorities in e-convergence technology, constituted the team of experts.

2.5 OVERVIEW

Multimedia helps in bringing us closer to an optimum instructional, communicative and productive environment and offers exciting learning opportunities, dynamic tools for communication and responsive fast approaches to do all kinds of work-personal or official. In education multimedia programmes can enrich the experiences of the children and help the teachers to handle the text and study materials more effectively. Multimedia has the unique strength of communicating difficult concepts in simple ways. It keeps the child in the centre of teaching learning process and thus proves effective in the classrooms.